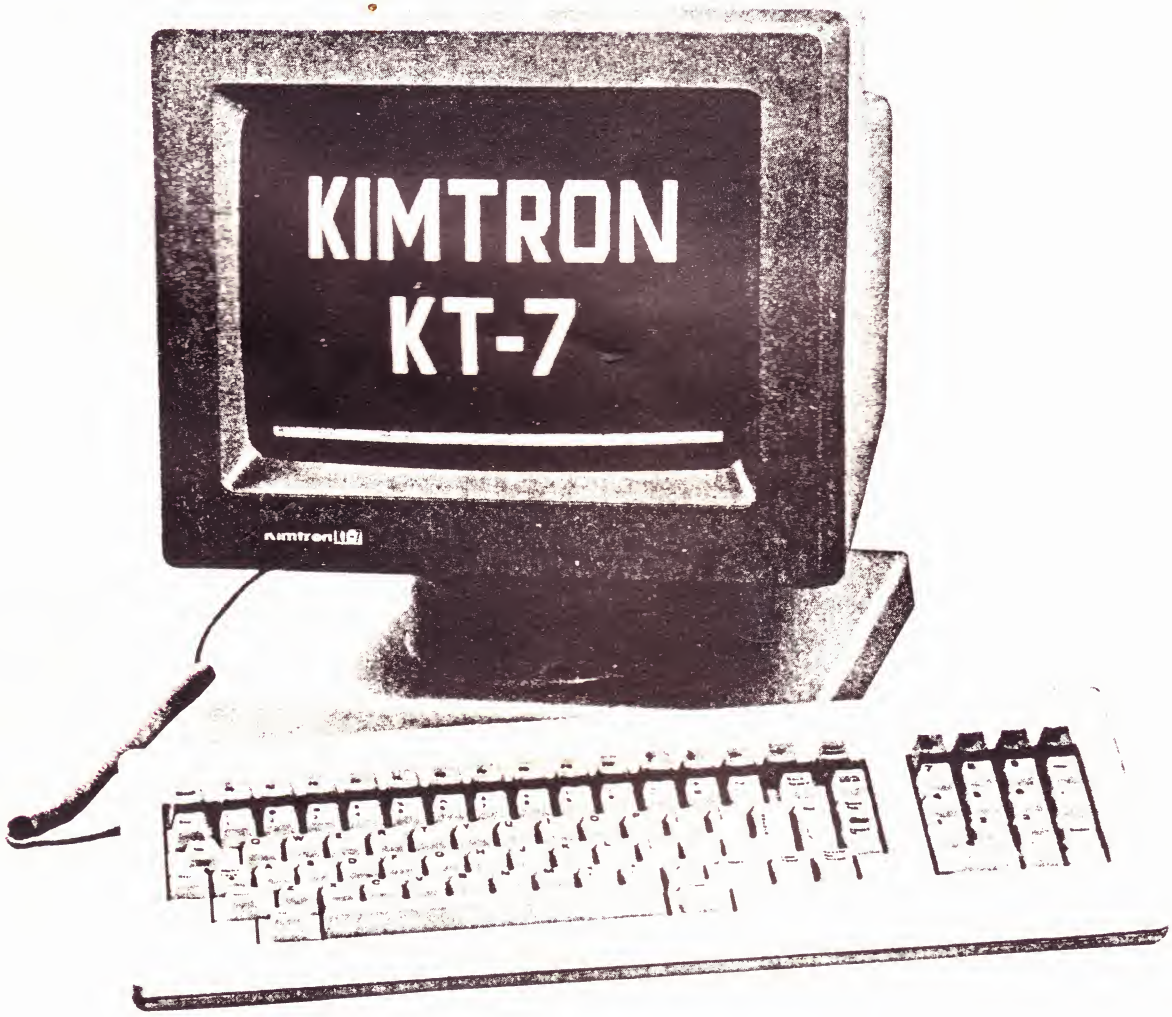
Model KT-7 Video Terminal
Operator's Manual



Kimtron

KIMTRON MODEL KT-7 VIDEO TERMINAL
OPERATOR'S GUIDE

KIMTRON CORPORATION

1705 Junction Court
Building #160
San Jose, California 95112
Telephone: (408)436-6550
TWX: 910-338-0237

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DISCLAIMER

"Kimtron Corporation makes no representations of warranties with respect to this manual. Furthermore, Kimtron Corporation reserves the right to make changes in the specifications of the product described within this manual at any time without notice and without obligation of Kimtron Corporation to notify any person of such revision or changes."

WARNING

Keep away from live circuits

"This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual may cause interference to radio communications. This product has been tested for compliance with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference, in which case, the user, at his own expense, will be required to take whatever measures may be required to correct the interference."

WARNING

Voltage hazardous to human life are exposed within the cabinet. Use extreme caution when servicing either the power supply or any area where power terminals are exposed.

CAUTION

Under certain conditions, dangerous potentials may exist when the power is off, because of charges retained by capacitors and the CRT. To avoid injury, always remove power and dishcharge a circuit to ground before touching it. Never reach into the cabinet to service the equipment unless someone capable of giving aid is present.

ADDITIONAL WARNING

If the CRT tube should break, always wear heavy rubber gloves or use tongs to pick up the broken CRT pieces. The coating on the inside of the tube is poisonous.

WARRANTY AND WARRANTY RETURN PROCEDURE

Kimtron Corporation warrants that its products will be free from defects in material and workmanship for a period of 90 days from the date of shipment from the factory.

If a customer experiences a defect in either workmanship or materials during the warranty period, notify your supplier immediately. Your supplier may repair the terminal or determine if some other action is to be taken. In the event that a return of the terminal is deemed necessary, obtain a RETURN GOODS AUTHORIZATION (RMA) NUMBER from your supplier.

Repack the equipment in the original packing material and ship it in accordance with your supplier's shipping instructions. Make sure that the RMA number is clearly marked on the shipping label. Your supplier will not accept delivery of a return shipment without the proper RMA number.

SERVICE AND TECHNICAL ASSISTANCE

If your terminal requires sevice and it is out of warranty, you should follow the same procedure with your supplier as explained in WARRANTY RETURN PROCEDURE. Your supplier will be happy to provide you with any technical assistance pertaining to the use or maintenance of the terminal. Be well prepared with all of the necessary and specific information before you place a call to your supplier.

NOTE

Record the date of purchase and serial number of your terminal in the space provided below. The serial number is located on the back of the terminal.

Terminal Serial Number: _____

Date of Purchase: _____

REVISION CONTROL RECORD

As information pertaining to this product changes, revised pages may be issued. Changes will be noted by a heavy vertical bar in the margin. Replace the outdated page(s) with the revised page(s) and make note of this occurrance in the space provided below.

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CHAPTER 1 INTRODUCTION

1.1 How to Use This Manual

It is important to read this Operator's Guide thoroughly before using the KT-7. Chapters 3 through 5 of this manual are extremely important, as they contain all the basic information necessary for installing and operating the terminal. A complete Table of Contents, List of Figures, and List of Tables are provided at the front of this manual. If you have difficulty finding information, and do not find it listed in the front matter, consult the detailed subject index at the end of this manual.

Reference is made throughout this manual to escape and control code sequences. A "Quick Reference Guide to Terminal Functions," Escape and Control Code Sequences, an ASCII chart, and various other technical tables are provided as appendices to summarize these codes.

1.2 Conventions

A few conventions are consistent throughout this manual and should be understood before you begin operating your terminal:

1. The characters ESC represent the ESC (Escape) key located on the upper left of the keyboard. When you see these characters, you are to press the ESC key: do not type the actual characters E S C.

2. Escape code sequences are listed as ESC x, where x represents the code to be entered. Please note that the space separating the characters ESC and x is for clarity: do not enter the space character (space bar). If you are to press the space bar in a control or escape code sequence, this will be indicated by the word SPACE.

3. Control code sequences are listed as CTRL/X, where X represents part of the code to be entered. Unlike the ESC code sequence where each key is pressed independently, the keys pressed in a CTRL code sequence are entered while the CTRL key is pressed. You must hold down the CTRL key while typing the character following CTRL in the command sequence. This is similar to using the SHIFT key to enter an upper case "S"; you must depress the SHIFT key while typing the character "S".

4. The word SHIFT or Shift indicates that you are to use the SHIFT key when entering a command or code sequence.

5. Code sequences with each code separated by commas or spaces are to be entered sequencially. For example:

Cmd, F4

F4 is to be pressed after the Cmd key is pressed.

6. Code sequences separated by a slash (/) are to be entered simultaneously. For example:

Shift/F4

F4 is to be pressed while the shift key is held down.

7. ASCII codes are represented by their column and row position in the ASCII table matrix, with the row and the column numbers separated by a slash (/). For example:

4/01

represents the character "A" which is on the 4th column and the first row of the ASCII code table matrix.

CHAPTER 2 TERMINAL OVERVIEW AND SPECIFICATIONS

2.1 General Description

The Kimtron KT-7 video terminal is an alphanumeric computer terminal. It supports a subset of the ANSI X3.64 standard and many advanced Kimtron private functions. It supports connections to two separate devices simultaneously and provides nonvolatile memory for storage of desired contrast setting, setup parameters, programmable functions, and programmable answerback.

2.2 Display Characteristics

The data image displayed on the screen consists of 24 lines of 80 columns each. The displayed characters may be entered from the keyboard or received from the host, or auxiliary device. A special 25th line of the screen is used as a Status Line for displaying various terminal status data, or as a User Line for displaying programmed user message data.

A total of 256 different characters may be displayed on the screen: that includes the standard 128 ASCII characters and 128 supplementary characters. The supplementary character set includes block graphics symbols, line graphics symbols, and international characters.

There are five visual attributes available: reverse, blinking, underline, half intensity, and invisible characters.

2.3 Keyboard Characteristics

This terminal uses a typewriter-style keyboard layout. In addition to the standard alphanumeric keys, the keyboard includes a numeric keypad, special function keys, and programmable function keys.

If the keys are pressed longer than 0.5 seconds, the key codes will be automatically repeated at the rate of 15 characters per second. This feature may be disabled via the setup mode or by entering an appropriate command. (See Section 5.1.3 and 5.1.4 for the keys which are not repeated automatically regardless of auto repeat mode.)

Two-key rollover is another feature of this keyboard. When three or more keys are pressed at the same time, only two keys are transmitted to the terminal in the order they were entered. The third key is ignored until one of the two entered keys is released.

2.4 Communications Characteristics

This terminal has a Main Port and an Auxiliary Port which provide EIA RS-232C compatible interfaces. Fifteen baud rates of up to 19.2K BPS are available for the main port and auxiliary port. Baud rate, word length, parity, and stop bit settings for each port may be selected independently via the setup mode.

The main port interface is provided primarily for communication between the host and the terminal. Both X-On/X-Off and DTR flow control protocols are supported by the main port; this port may be configured for optional current loop or EIA RS-422 interface operation instead of EIA RS-232 interface. See Section 3.2.1 and Section 3.2.2 for optional configurations.

The auxiliary interface is provided primarily for communication between the terminal and an auxiliary device (typically a serial printer). This port supports both X-On/X-Off and Busy/Ready flow controls generated by the printer. This port may be configured for optional current loop or EIA RS-422 interface operations instead of standard EIA RS-232 interface.

Data communication is asynchronous, and the data length selected can be seven or eight bits. The parity mode may be selected among odd, even, mark, space, or no parity.

2.5 Technical Specifications

DISPLAY

CRT:	12-inch or 14-inch diagonally
25th line:	Status Line or User Line
Character:	7 X 11 dot matrix in 9 X 13 cell
Paging:	Up to four pages
Character Set:	128 ASCII characters 4 International character sets Supplementary character sets which include Special graphic sets, Multinational character sets, and Mosaic character sets
Video Attributes:	Blinking Underline Half Intensity Reverse Invisible

Cursor Type: Blinking Block
Steady Block
Blinking Underline
Steady Underline
No Cursor

COMMUNICATIONS

(Main Port)

Type: EIA RS-232C
Optional 20 mA Current Loop
Optional EIA RS-422

Speeds: 50, 75, 110, 135, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, 19200 BPS

Parity: Even, Odd, Mark, Space, No Parity

Method: ASCII Asynchronous Serial

Flow Controls: Inflow X-On/X-Off, DTR
Outflow X-On/X-Off

Modes: Full Duplex, Half Duplex, Block

(Auxiliary Port)

Type: EIA RS-232C

Speeds: 50, 75, 110, 135, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, 19200 BPS

Parity: Even, Odd, Mark, Space, No Parity

Method: ASCII Asynchronous Serial

Flow Control: Inflow X-On/X-Off
Outflow X-On/X-Off, Busy/Ready (DTR)

Modes: Full Duplex, Block mode

KEYBOARD

Typewriter-Style
Detachable
Sculptured Style for Alphanumeric Pad
2-Key Rollover
Keyboard Lock/Unlock
Electronic Keyclick
Auxiliary Numeric Keypad

POWER

Line Voltage:	115/230V
Line Frequency:	50 Hz/60 Hz
Power Consumption:	45 Watts

ENVIRONMENTAL

		°C		°C	°F	
Temperature:	10	to 40	C	(50	104	F)
Humidity:	10% to 90%					
Altitude:	Up to 3000 meters					

MECHANICAL

Dimensions:	Cabinet Height-	360	mm (14.2 inches)
		420	mm (16.5 inches) with the collar
	Width -	328	mm (12.9 inches)
	Depth -	339	mm (13.3 inches)
	Keyboard Height-	36.5	mm (1.4 inches)
	Width -	455	mm (17.9 inches)
	Depth -	186	mm (7.3 inches)
Weight:	Terminal-	8.3	Kg (18.8 pounds)
	Keyboard-	1.5	Kg (3.3 pounds)

Shipping Weight:
12.5 Kg (27.6 pounds)

NOTE: Specifications subject to change without prior notice.

CHAPTER 3 INSTALLATION AND INTERFACE REQUIREMENTS

This chapter describes the procedures for installing the Kimtron KT-7 terminal and its requirements for interface with external devices such as the host computer or printer, via EIA ports. Read this chapter thoroughly before installation to avoid any damage to the terminal due to improper installation and incorrect interfaces.

3.1 Installing the Terminal

This section contains procedures for installing the Kimtron model KT-7 video terminal. It includes instructions for unpacking and inspection and it explains the procedures for connecting the terminal to the keyboard, power configurations and requirements, and systems interconnections.

3.1.1 Receiving Inspection

When the terminal is delivered by the transfer company, it must be carefully inspected for damage. Prior to accepting delivery, carefully inspect the shipping container for obvious damage. If damage is seen, note it on the waybill and require that the delivery agent sign the waybill. Notify the transfer company immediately, and submit a damage report to the carrier.

NOTE: If the terminal must be reshipped for any reason, it must be repacked in a manner that will prevent damage while in transit.

3.1.2 Site Preparation

There are very few constraints to selecting the desired work space in which to install your terminal. Extreme temperature and/or humidity, however, should be avoided.

The Kimtron model KT-7 requires an area 16.5 inches (420 mm) high x 12.9 inches (328 mm) wide x 13.3 inches (339 mm) deep. Additional space for ventilation clearance is not required. Terminal weight (including keyboard) is 21.7 pounds (10 kg).

The installation site should have a 115 VAC 60 Hz, 65 watts power source in the immediate vicinity; in the United States, this is a NEMA standard 5-15R, 3-prong receptacle. To ensure adequate protection from electrical shock and provide immunity from stray fields, a proper ground must be provided on the power source.

This equipment contains a semiconductor memory device in which various setup data is stored. This device is very sensitive to electrical surge, fluctuation, broadband noise, and unusually high levels of electrostatic discharge through the equipment. If this equipment is exposed to any one or a combination of these adverse environments, changes in stored setup data may be observed. It is recommended that you eliminate the adverse condition. Actions such as installing a constant voltage transformer and/or surge isolator and conductive mat can be taken.

NOTE: DO NOT PLUG IN THE TERMINAL until you read Section 3.1.5 and are sure the proper voltage setting has been selected.

3.1.3 Unpacking Instructions

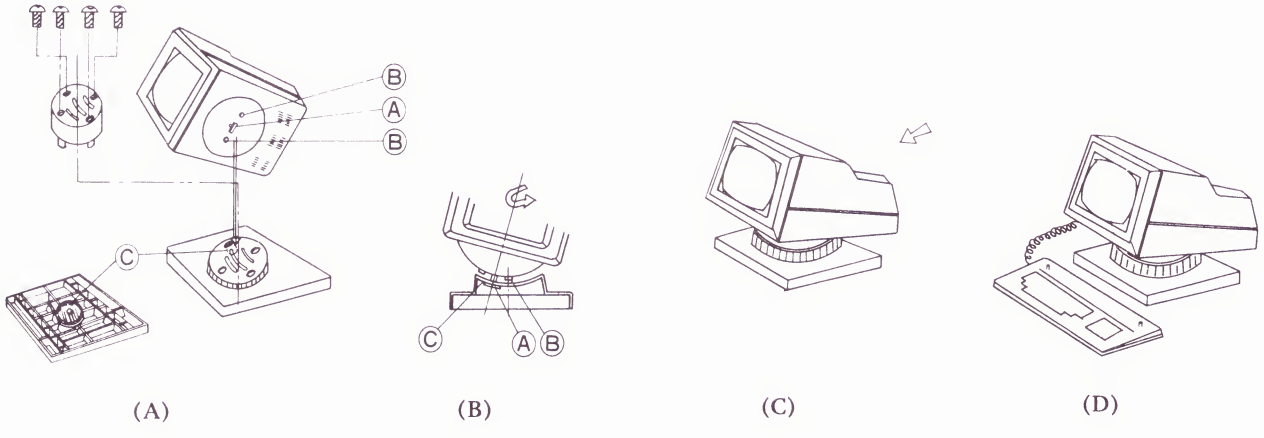
The shipping carton contains the main unit, pedestal, neck, keyboard with cable, Operator's Guide, and power cord. Follow the procedure outlined below to properly unpack these items.

1. Remove all packing material. **Save all packing materials for possible use in reshipping the terminal.**

2. Read this section of the Operator's Guide thoroughly before proceeding.

3. Carefully lift the keyboard and video terminal out of the box and place it in the desired work area, making sure that air can circulate freely around the rear, base, and top of the unit. Check to see that the cables are free of kinks or tight bends. Assemble the main cabinet and the pedestal as follows:

 a. Place the main cabinet upside down on a flat surface.



(A) (B) (C) (D)

Figure 3-1: How to Assemble Main Cabinet and Pedestal

b. Attach the neck to the pedestal as shown in Figure 3.1 (A). If you do not want to install the neck, skip this procedure.

c. Attach the pedestal to the main cabinet or neck as shown in Figure 3-1 (A). An indent in the bottom of the base is provided for rotating the pedestal 90 degrees. Pull the pedestal slightly away from the base of the terminal while rotating. Make sure that the short end of the pedestal faces the front of the terminal.

d. Slide the pedestal along the guide groove to the rear side of the cabinet to locate the center of the pedestal at the protruded area (slide guide) of the main cabinet. Refer to Figure 3-1 (C).

e. Place terminal on pedestal, being careful not to damage the cabinet and the pedestal. Hold the main cabinet tightly with both hands, lifting it high enough to place the terminal in the proper position.

4. Inspect the terminal for external damage.

5. Remove the two screws located on the rear of the main unit, and lift off the cover. Inspect the interior for signs of damage and/or missing parts. (Figure 3-2 shows the terminal interior).

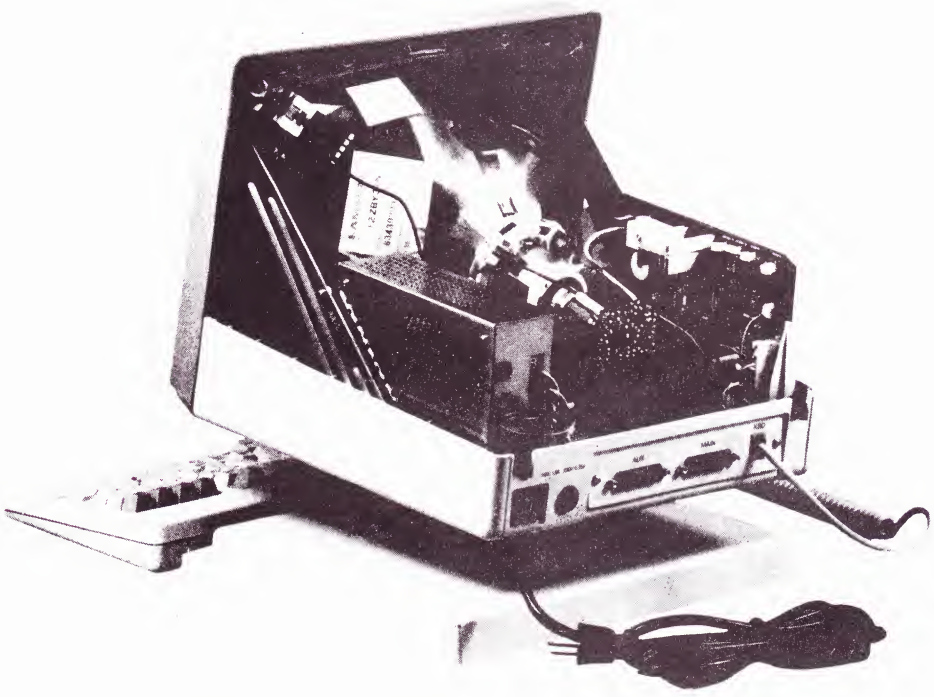


Figure 3-2: Kimtron Model KT-7 Video Terminal-Interior View

3.1.4 Shipping Damage Inspection

If damage to the video terminal is apparent, notify the transfer company immediately. Save all packing materials for the transfer company's inspection and file a damage report with the carrier.

Damage to equipment in transit is not covered under warranty. Promptly notifying the transfer company of damage will ensure claim validity and will help expedite payment for necessary repairs by the transfer company or its insurance agent.

3.1.5 Power Configuration

The Kimtron model KT-7 will operate at 115 VAC or 230 VAC, depending upon the rating of the user site power line. Locate the voltage selection jumper on the power supply board inside the terminal. Standard factory setting in the U.S. is 115V. If the factory setting of this switch is not appropriate for the installation site, follow the modification procedure listed below to correct it. (This jumper must be properly set before turning on the terminal.)

1. Remove the two screws located on the rear of the terminal and remove the top cover.

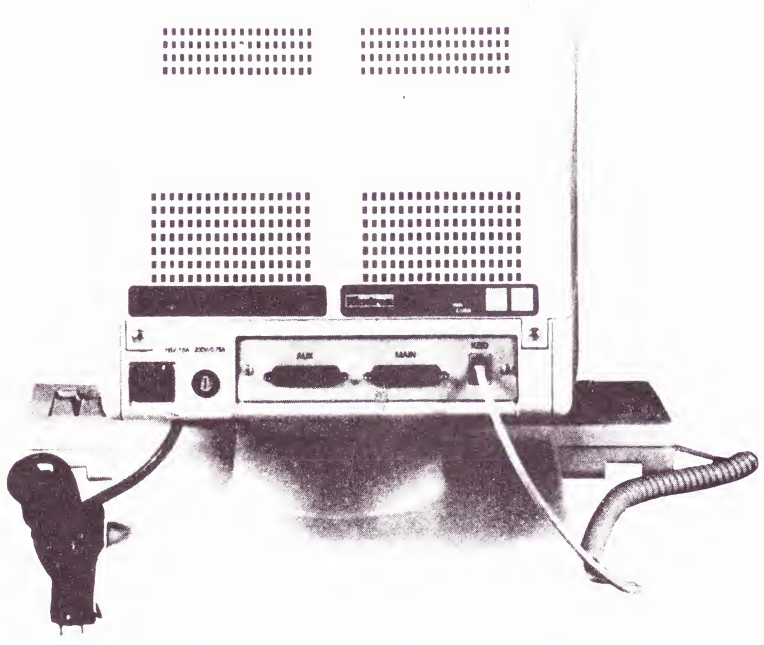


Figure 3-3: Rear View-Kimtron KT-7 Video Terminal

2. Remove the three screws located on the side of the power module and lift off the power shield cover.

3. Set the voltage selection jumper for the proper voltage setting.

WARNING: Failure to set this switch properly may result in damage to the terminal.

Also verify that the rating of the fuse, located in the fuse holder on the rear panel, is adequate for input power. The standard fuse shipped from the factory is a 125V 1.5 amp fast blow fuse. For 220 VAC applications, a 230 V 0.75 amp instantaneous (fast blow) fuse should be installed.

3.1.6 Cable Connections

The main unit of the video terminal must be connected to the keyboard. In addition, you need to connect the terminal to either a computer system or communications device (modem, coupler, etc.) which will allow access to a remote computer system. Optionally, you may connect the terminal to a printer or other auxiliary device.

Keyboard Connection

One end of the keyboard cable is connected to the keyboard. The other end must be plugged into the adapter marked "KBD" located on the rear panel of the main unit. (See Figure 3-3).

Main Port Connection

A standard RS-232C interface cable is required for connecting the Kimtron model KT-7 terminal to the host system or communications device. This cable is not provided with your terminal.

Connect one end of the EIA RS-232C cable to the port labeled "MAIN" on the terminal, and the other end to the computer system/modem. Refer to Section 3.2.1 for detailed interface requirements.

Auxiliary Device Connection

An auxiliary device may be connected to the terminal via the port labeled "AUX". The auxiliary device is typically a printer. The auxiliary device must be equipped with an RS-232C or other optional interface that your terminal is equipped with.

3.1.7 Power On Procedures

1. One end of the power cord is connected to the main unit.

2. Make sure that the power switch (from the rear, located in the lower left corner of the terminal) is in the OFF position.

3. Plug the terminal power cord into a grounded outlet. (See Section 3.1.2, Site Preparation.)

Once you have completed the steps outlined in this section, and have verified proper voltage selection and fuse rating, turn the power switch ON. If you see or smell smoke, turn the power OFF immediately.

3.1.8 Installation Checks

1. Within one second of power ON, a "beep" tone emits from the video terminal.

2. Within five to 15 seconds, a rectangular block (cursor) will appear in the upper left corner of the screen. If the cursor has been disabled previously, the cursor will not appear. In that case, turn the screen brightness all the way up and proceed to step 4. Brightness control is described in the next step.

3. Locate the BRIGHTNESS control knob on the bottom at the front left (right for the 14 inch screen) of the terminal. Adjust this switch for the desired screen brightness.

4. Press the key labeled "Local" while pressing the "Shift" key. The local key is located at the far right of the second row of the main keypad.

5. Press each of the keys on the keyboard and verify that the characters typed are properly displayed on the screen. At this point, you may wish to readjust the screen brightness.

6. Repeat Step 5 while holding the shift key down.

3.2 INTERFACING THE TERMINAL

This section will provide information on each of the interfaces installed in the Model KT-7 terminal, the pin-outs, and other interface requirements for use with your host computer system. A careful study of your system's specific requirements may be required to properly interface the terminal.

Three separate interface ports are provided as a standard part of your terminal: the main port, the auxiliary port, and the keyboard connection.

3.2.1 Main Port Interface

The standard 25-pin RS-232C port located on the back of the terminal provides the connection to either the data communication device or the host computer directly. Pin connections for this interface are provided in Table 3-1.

Table 3-1. Pin Connections: Main Port Interface (J2)

PIN NO.	EIA DESIGNATION	DIRECTION	DESCRIPTION
1	AA	-------	Protective Ground
2	BA	From Terminal	Transmit Data Output
3	BB	To Terminal	Receive Data Input
4	CA	From Terminal	Request to Send Output
5	CB	To Terminal	Clear to Send Input
6	CC	To Terminal	Data Set Ready Input
7	AB	-------	Signal Ground
8		To Terminal	Carrier Detect
9		From Terminal	20 mA source +12 V (Optional*)
10		-------	
11		-------	
12		To Terminal	Receive Current Loop + (Optional*)
13		From Terminal	Transmit Current Loop - (Optional*)
14		From Terminal	20 mA source +12 V (Optional*)
15	Not Used	-------	
18			
19		From Terminal	Always high
20	CD	From Terminal	Data Terminal Ready
21	Not Used		
22		To Terminal	Ring Indicator
23		From Terminal	Always high
24		To Terminal	Receive Current Loop - (Optional*)
25		From Terminal	Transmit Current Loop + (Optional*)

* available only when current loop is installed

3.2.2 Auxiliary Port Interface (Printer Port)

This port is labeled "AUX" at the rear panel of the terminal. It provides an interface to an auxiliary device (generally a printer). This port has a DCE pin-out configuration. Any RS-232C compatible serial printer equipped with X-On/X-Off or Busy/Ready protocol can be used. If your printer is equipped with Busy/Ready signal, connect the Busy/Ready signal from the printer to Pin 20 (DSR Input) of the terminal. If Busy/Ready is not used, Pin 20 must be left disconnected or held at a positive EIA level.

The device connected to this interface must operate with a data rate, word structure, and parity which is consistent with one of the terminal configurations available through the set-up mode. (See Section 4.2.) Refer to your printer manual for specific interface requirements. Pin connections for the auxiliary port interface (J3) are shown in Table 3-2.

Table 3-2
Pin Connections: Auxiliary Port Interface (J3)

PIN NO.	EIA DESIGNATION	DIRECTION	DESCRIPTION
1	AA	-------	Protective Ground
2	BB	To Terminal	Receive Data Input
3	BA	From Terminal	Transmit Data Output
4	CA	To Terminal	Clear to Send Input
5	CB	From Terminal	Request to Send Output
6	CC	From Terminal	Data Terminal Ready Output
7	AB	-------	Signal Ground
8	CF	From Terminal	Data Carrier Detect Always high
9		From Terminal	RS-422 Xmit Clock High *
10		From Terminal	RS-422 Xmit Clock Low *
11		From Terminal	RS-422 Xmit Data Low *
12		From Terminal	RS-422 Xmit Data High *
13		From Terminal	RS-422 Request Send High*
14		From Terminal	RS-422 Request Send Low *
15	Not used		
16	Not used		
17		To Terminal	Receive Clock Low *
18		To Terminal	Receive Clock High *
19	Not Used		
20	CD	To Terminal	Data Set Ready (Busy/Ready)
21		To Terminal	RS422 Receive Data High*
22	Not used		
23		To Terminal	RS-422 Receive Data High*
24		To Terminal	RS-422 Clear To Send High
25		To Terminal	RS-422 Clear To Send Low*

* These are the main port RS-422 signals. They are embedded within the auxiliary port since there are not enough lines available in the main port. These are available only when RS-422 option is installed.

3.2.3 Keyboard Interface

The six-pin J10 type keyboard connector is provided on the rear panel of the terminal for the keyboard connection. The pin assignments are shown in Table 3-3.

Table 3-3: Pin Connections: Keyboard Interface (J1)

PIN NO.	DESCRIPTION
1	AC ground
2	DC ground
3	+12 V
4	Busy (From keyboard)
5	Receive (To Keyboard)
6	Transmit (From Keyboard)

3.3 Data Flow Controls

Kimtron's KT-7 supports both X-ON/X-OFF control and DTR level control to insure that no data is lost due to the buffer overflow. The supported data flow controls on both EIA ports are summarized below.

MAIN PORT	Received data	X-ON/X-OFF, DTR
	Transmitted data	X-ON/X-OFF
AUX. PORT	Received Data	X-ON/X-OFF
	Transmitted Data	X-ON/X-OFF, DTR

The data transfer conditions are designated as follows:

X-OFF	An ASCII code with value 1/1. Stop the data transfer.
X-ON	An ACSII code with value 1/3. Resume the data transfer.
DTR low	Stop the data transfer.
DTR high	Resume the data transfer.

3.3.1 Main Port Received Data Flow Controls

Kimtron's KT-7 has a 256 character buffer to receive data from the main EIA port. The main EIA port supports both X-ON/X-OFF and DTR level flow control to ensure that no received data is lost. Either or both flow controls can be selected in the setup mode. (See Chapter 4 for detailed setup mode procedures.) Their operations are described as follows:

X-ON/X-OFF When the receive buffer is 240 bytes full, the terminal generates an X-OFF code to the host. An X-OFF code is a DC1 (1/1) ASCII control character. Upon receiving this character, the host should stop sending the data to the terminal until an X-ON code is received from the terminal. The terminal will generate an X-ON code to the host when the data in the buffer is processed and the buffer has less than 32 characters left to be processed.

DTR DTR is an EIA level control signal from the terminal to the host or the device attached to the terminal main port. When the terminal buffer is 240 bytes full, the terminal will bring the DTR signal low, signaling to the host that the terminal is busy, and no more data can be accepted. As soon as DTR goes to low-state, the host should stop sending the data to the terminal until DTR goes back to high state. The terminal will set DTR back to high-state when the buffer has less than 32 characters left.

3.3.2 Main Port Transmitted Data Flow Control

When the transmitted data flow control is enabled, the main port recognizes an X-ON/X-OFF code from the host. The transmitted data flow control can be enabled in the setup mode. (Refer to Section 4.2.)

Upon receiving an X-OFF code, the terminal will stop sending data to the host until the X-OFF is cleared by an X-ON code.

3.3.3 Auxiliary Port Received Data Flow Control

The auxiliary port includes a 256 byte buffer to receive data from the device attached to the auxiliary port. (The device may be a printer or a secondary host computer.) The received data control on this port may be enabled via the setup mode. Only X-ON/X-OFF control is available in this port for received data flow control. When the receive buffer is 128 bytes full, the terminal will generate an X-OFF code to the device attached to the auxiliary device. An X-ON code will be generated to clear the X-OFF condition when the buffer has less than 32 bytes left in it.

3.3.4 Auxiliary Port Transmitted Data Flow Control

Both X-ON/OFF control and DTR level control are supported for the auxiliary port transmitted data flow control. You can select either or both controls in the terminal setup mode.

CHAPTER 4 SETUP MODE AND STATUS LINE

The KT-7 terminal provides a terminal setup mode that the user can use to modify the operational characteristics of the terminal, such as communications parameters or emulation modes. The setup mode can be accessed by the user only from the keyboard. The setups are menu driven and parameters can be changed easily by using the cursor control keys on the keyboard.

The setup mode is divided into two separate modes-- mode A, and mode B. Setup mode A contains all the communications setup parameters and the contrast setup field. Setup mode B contains other operational parameters. Each setup mode is explained in subsequent sections.

4.1 Setup Mode Controls

The setup mode can be accessed and controlled only from the keyboard. This section describes how to enter and operate in the setup mode.

4.1.1 Entering and Exiting the Setup Mode:

Press the **Shift/Setup** key to enter the setup mode. When the terminal is not in the setup mode, this key enables setup mode A. While the terminal is in setup mode A, this key enables setup mode B. Press this key while in setup mode B or the Return key to exit the setup mode. The **Return** key causes the terminal to exit from either setup mode A or B.

4.1.2 Moving the Cursor In the Setup Mode:

Use the **cursor left** or **right arrow** keys to move across the setup fields. When the cursor reaches the field farthest left, the cursor wraps around to the field farthest to the right and vice-versa.

4.1.3 Changing Setup Values:

Press the **cursor up arrow** key to change the value of each setup field. When the maximum value is reached, the minimum value will be shown again. Press the **cursor down arrow** key to decrease the parameter's value.

4.1.4 Changing The Screen Intensity:

Enter setup mode A. Move the cursor to the last field labeled CT. Press the up arrow key to increase the screen intensity. Press the down arrow key to decrease the screen intensity.

4.1.5 Returning to the Default Value:

Pressing Ctrl/D while in the setup mode restores the default values for both setup A and setup B. Default values are shown in figures 4-1, 4-2 and 4-3. When Ctrl/D is pressed, the setup cursor goes to the first field of setup mode A. The tab position is also set to every eighth column.

4.2 Setup Mode A

The first 10 fields of setup mode A are for EIA serial port communication parameters. The last two fields are for the screen refresh rate and intensity control, respectively. Figure 4-1 illustrates setup mode A with its default values.

Field 1: Main Port Baud Rate

This field defines the speed at which data is transmitted from the terminal to the host. It also determines the necessary data rate from the host to the terminal. Set this field to match the data rate required by the host for transmitting and receiving data. Available values are 50 BPS through 19.2K BPS (Bits Per Second).

Field 2: Main Port Word Length

This field defines the total number of data bits per character transmitted and the required number of data bits for the characters received. Word length can be either seven or eight bits. Set this field to match that of the host to avoid erroneous characters being received and transmitted.

Field 3: Main Port Stop Bits

The number of stop bits, one or two in each character frame, may be selected. Set this field to match the number of stop bits required by the host.

Field 4: Main Port Parity

This field defines the parity mode of the characters sent to the host from the terminal. It also determines the required parity mode for characters received. Five different parity modes are available: Odd, Even, Space, Mark, and No Parity.

If Odd or Even parity is selected, all transmitted characters will have odd or even parity bits and all received characters will be checked for odd or even parity.

If Mark or Space parity is selected, parity is not checked on the received data, even if Mark or Space parity is generated for the transmitted data.

No parity is generated or checked if set to "no parity".

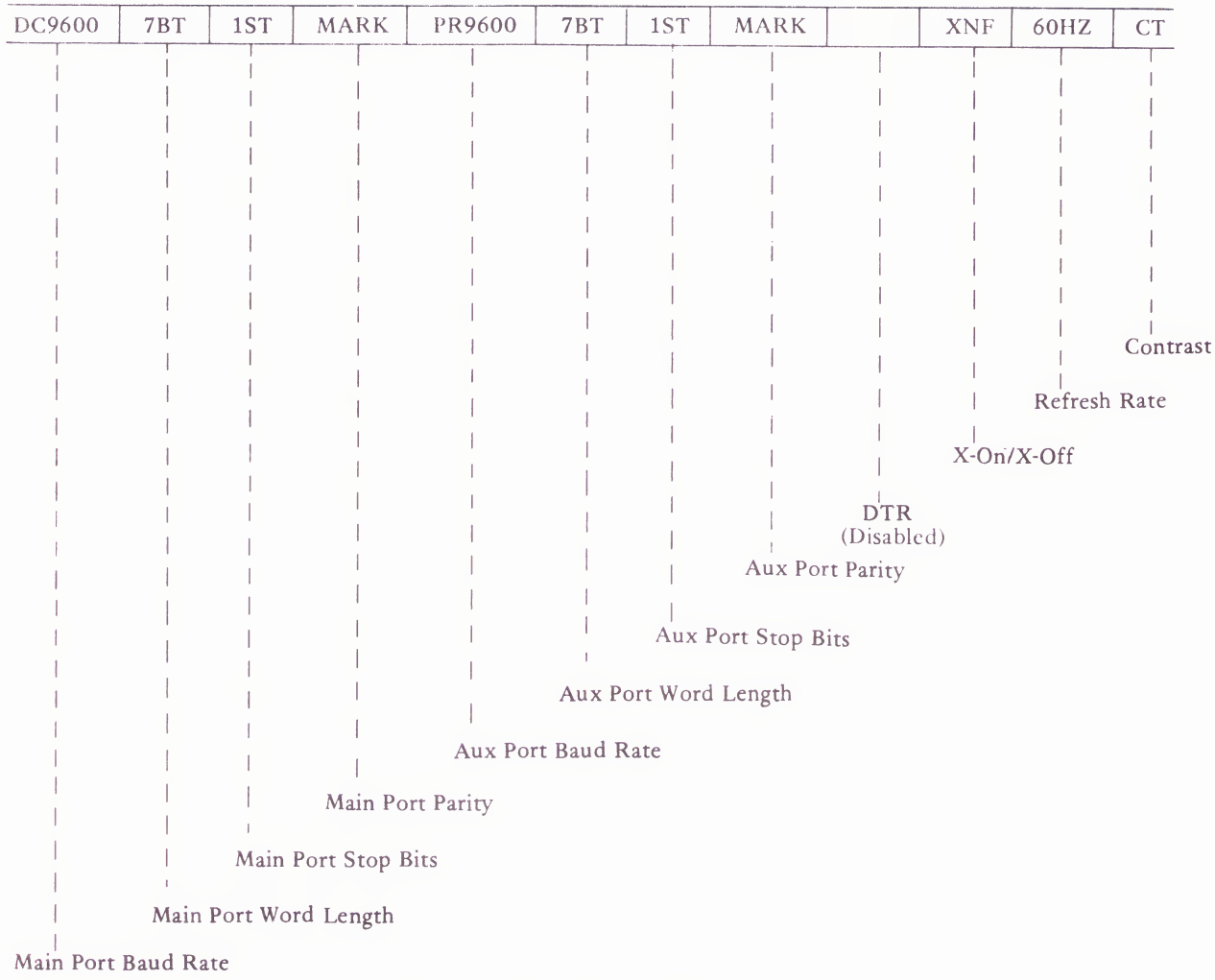


Figure 4-1. Setup Mode A

Field 5: Auxiliary Port Baud Rate

This field determines the communication speed at which data is sent and received between the terminal and auxiliary device. Set this field to match the data rate required by the auxiliary device. Available data rates are: 50, 75, 110, 135, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, and 19.2K BPS (Bits Per Second).

Field 6: Auxiliary Port Word Length

This field defines the total number of data bits per each character received and transmitted via the auxiliary port. Word length can be either seven or eight bits.

Field 7: Auxiliary Port Stop Bits

The number of stop bits in each character frame can be either one or two bits. Set this field to match the number of stop bits required by the auxiliary device.

Field 8: Auxiliary Port Parity

This field defines the parity of the character transmitted and received via the auxiliary port. See "Main Port Parity" for available parity modes.

Field 9: Main Port DTR Control Enable/Disable

When "DTR" is displayed, the DTR flow control for the main port is enabled. Toggle this field to blank to disable DTR control. See section 3.3.1 for DTR control. When disabled, the DTR line of the main port is held high.

Field 10 : Main port X-ON/X-OFF control

When "XNF" is displayed in this field, the X-ON/X-OFF flow control for the main port is enabled. Toggle this field to blank to disable X-ON/X-OFF control. See section 3.3.1 for an explanation of X-ON/X-OFF control.

Field 11: Screen Refresh Rate

This field defines the screen refresh rate. Set this field to 50 or 60 Hz depending upon A.C. power line frequency. The United States uses 60 Hz. The refresh rate is set according to the value of this field when the setup mode is terminated.

4.3 Setup Mode B

Setup mode B is illustrated in Figure 4-2. Setup Mode B consists of:

1) Firmware version number display
2) Setup sections 1 through 5
3) Field name message window
4) Field value message window

The two digit number following the word "Vers" identifies the firmware version of the terminal.

Fields in setup line B are organized into five sections, separated by a vertical bar (|). Each setup section consists of a number of fields (digits) with each digit representing the current terminal parameters. The field in each section controls the characteristics of the terminal as follows.

Section 1: Terminal operations mode
Section 2: Keyboard operations mode
Section 3: Printer operations mode
Section 4: Host communications in block mode
Section 5: Emulation dependent operations mode

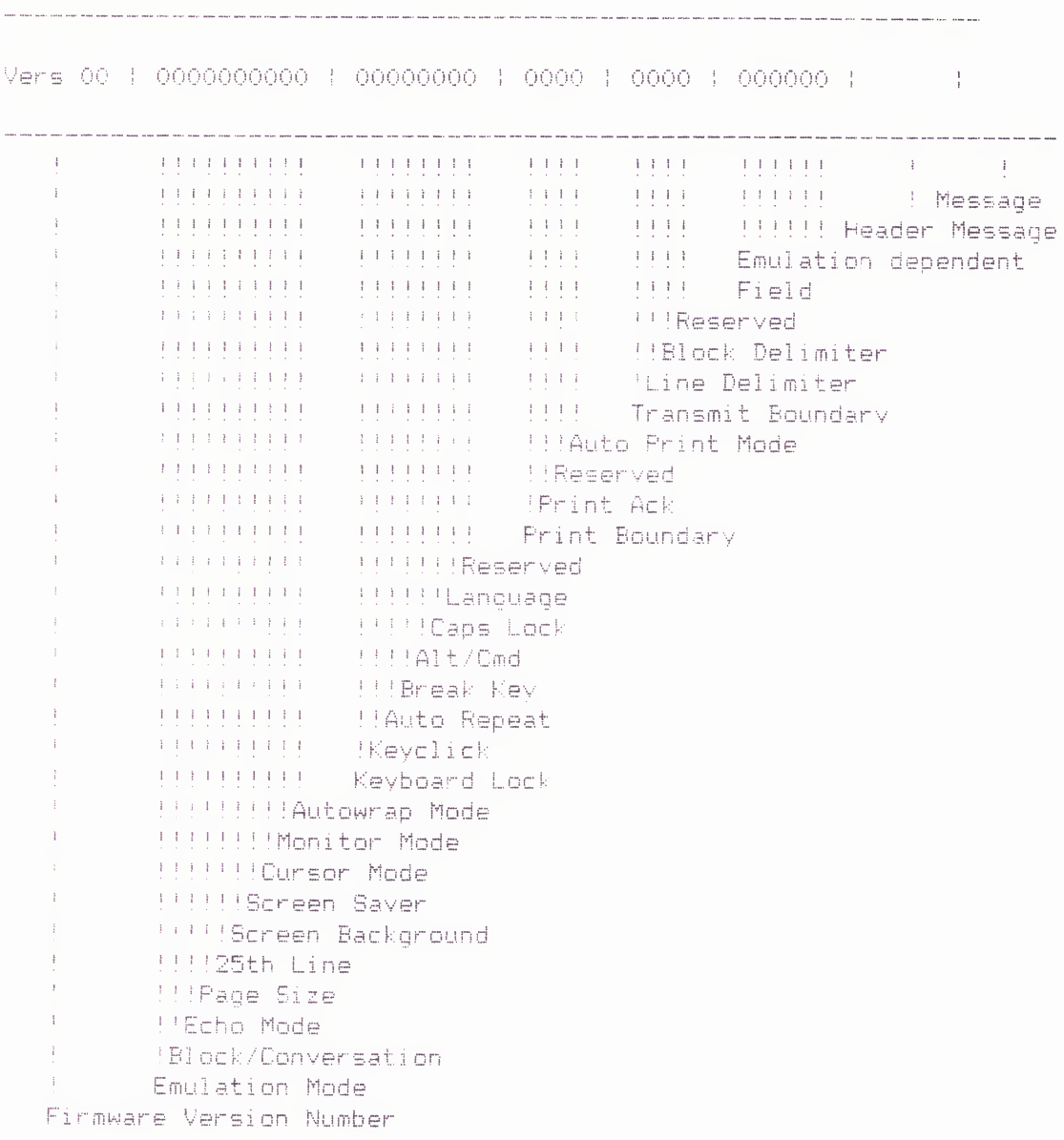


Figure 4-2. Setup Mode B

4.3.1 Section 1 Setup Fields

Setup parameters pertaining to terminal operations are included in this section. The fields in this section apply to all emulation modes.

Field 1: Emulation
The terminal emulation is selected in this field. The emulation modes available are: Native, TVI-920, VT-100, VT-52, and D100/200. In native mode, the KT-7 terminal is fully compatible with TVI-925 terminals. When the value of this field is changed, the following changes also occur:

i. The section 5 fields (emulation dependent modes) are updated to reflect values for the new emulations mode. See section 4.3.5 for Setup Section 5.

ii. The following modes are reset to their default values when the emulation mode is changed:

Conversation Mode: Enabled.
Echo Mode: Disabled.
Auto Wrap Mode: Disabled.
Local Edit Mode: Disabled.
Attribute Mode: Hidden
Newline Mode: Disabled
Linefeed Mode: Enabled.
Roll Mode: Enabled.
Protect Mode: Disabled
The ASCII character set is assigned to G0 and G1 set
G0 character set is selected as active set

Field 2: Block/Conv
This field defines whether the terminal is to operate in block mode or conversation mode. Refer to section 6.9.1 for block mode operations. This field requires resetting when the emulation mode is changed.

Field 3: Local Echo
When this field is set, data entered from the keyboard is sent to both the host and the terminal screen during online conversational operations. If this field is reset, keyboard data is sent to the host directly without being displayed on the screen. This field should be disabled for normal full duplex operations, and enabled for normal half duplex operations. See section 6.9.1 for a description of Local Echo mode operations.

Field 4: Page Size
Display page length is defined by this field. Values available are: 24, 48, and 96 lines per page. If this field is changed, the terminal is reset upon exiting the setup mode and the display memory is cleared. See section 6.4 and 7.5 for page controls.

Field 5: 25th Line
This field defines the use of the 25th line. The 25th line may be used as a status line, a user message line, or left as a blank line. The available values are:

0	None	No 25th line (Blank 25th line)
1	Status	Status Line Enabled
2	User	User Line Enabled

See section 4.4 for status line. When user line is enabled, user-supplied data is displayed. Section 10.2 shows how to program the user line.

Field 6: BackGrnd
Toggle this field to "Bright" to display dark characters on a bright background. "Dark" specifies a normal screen.

Field 7: Scrn Save
This field defines time limits before the screen saver is activated. The available values are: No Time Out, 4, 8, and 12 minutes. If the terminal remains inactive for the specified amount of time, the screen will be turned off although the power remains on. The screen will remain turned off until the terminal becomes active again. The terminal is considered inactive if no data is being received by either the keyboard or the host.

Field 8: Curs Mode
Cursor mode field. The shape of the cursor is changed by changing the value of this field. Available cursor modes are:

0	Blnk Blk	Blinking Block
1	Stdy Blk	Steady Block
2	Blnk Und	Blinking Underscore
3	Stdy Und	Steady Underscore
4	No Curs	Invisible Cursor

Field 9: Mntr Mode
The monitor mode can be enabled via this field instead of entering the escape sequence. The value "1" signifies enabled state and "0" disabled state. See section 6.3.5 for monitor mode operations.

Field 10: Auto Wrap

When this field is set to "1", auto line wrap is enabled. When the auto line wrap is enabled, the cursor moves to the first column of the next line when it reaches the right margin.

The value "0" in this field signifies that the auto line wrap is disabled. If auto wrap is disabled, the cursor stays on the right margin when it reaches the last column of the line, until explicit cursor movement commands are received.

4.3.2 Section 2 Setup Fields

Field 11: Keyboard

When this field is set to "1", the keyboard is locked and no data may be entered from the keyboard. Once the keyboard is locked, it can be unlocked only by the ESC sequence from the host, or by pressing CTRL and home keys on the keyboard. Leave this field as "0" unless the keyboard is to stay locked.

Field 12: Keyclick

When this field is set to "1", the keyboard generates an electronic keyclick whenever a key is pressed. Leave this field as "0" if electronic keyclick is not desired.

Field 13: Auto Repeat

When Auto Repeat is enabled, the keyboard will generate codes at the rate of 15 per second when a key is held down more than half a second. If disabled, each key generates a code only once when it is depressed. "0" in this field enables auto repeat and "1" designates disabled auto repeat.

Field 14: Break Key

Break key enable. When set to "0", the break key does not have any effect when it is pressed. The break key will generate a break signal when this field is set to "1".

Field 15: Alt/Cmd

Alt/Cmd key enable. When this field displays "1", the Alt and Cmd keys on the keyboard have no effect. If this field is set to "0", the Alt and Cmd keys can be used as user programmable function keys. See the appropriate emulation mode in the table of contents for user function keys.

In D100/200 mode, this field will not have any effect on the use of the Alt and Cmd keys, (Alt and Cmd keys are used as prefix action keys for the function keys), regardless of the value of this field.

Field 16: Caps Lock

When this field is set to "1", the alphabet keys on the keyboard will generate upper case characters. Pressing Alpha Lock will not release it until this field is set to "0". When this field is set to "0", the alphabetic lock is controlled solely by the Alpha Lock key.

When this field is set to "1", the LED on the Alpha Lock key will come on and all alphabetic character keys will be locked into their upper case positions. When this field is toggled to "0", the LED is turned off and the alphabetic keys will be returned to their lower case positions.

Field 17: Language

This field selects the keyboard language layout. The available field values are:

0	English	Standard English layout
1	German	German Layout
2	French	French layout
3	Spanish	Spanish Layout

The keyboard assumes different character layouts and generates different codes in each language mode. Refer to Appendix H for the layout in each mode. The language selected takes effect only when the current character set is the default ASCII set. If the current set is other than ASCII, (U.K., special graphics, mosaic, or multinational set), this field will be ignored.

Field 18: Reserved for future use.

4.3.3 Section 3 Setup Fields

This section consists of parameter fields pertaining to print mode control.

Field 19: Prnt Bndy

Print Boundary. This field defines the amount of data to be printed when the print key is pressed or the print command is received from the host.

0	Page	All data within the current page is printed.
1	Display	Only data currently displayed on the screen is printed.

Field 20: Prnt Ack

End of print acknowledgement. When a print ACK (acknowledge) character is selected, that character is sent to the host at the end of each page or screen printing. The available values are:

0	ACK	ASCII character ACK (06H) is selected as the print ACK character
1	None	No print acknowledge character

Field 21: Reserved for future use

Field 22: Auto Prnt

This field enables or disables transparent communication between the host and the printer.

0	Off	Auto Print is off
1	On	All data received from the host goes to the printer without being displayed on the screen.
2	On w/disp	All data received from the host is displayed on the terminal screen and goes to the printer.
3.	bidirect	Bidirectional print. The printer may send data to the host. Data received from the host goes to the printer and to the screen.

4.3.4 Section 4 Setup Fields

This section contains parameter fields pertaining to data transfer to the host.

Field 23: Xmit Bndy

Transmit boundary. This field defines the amount of data transferred when the xmit key is pressed or the transmit command is received while the terminal is in block mode. Available values are:

0	Page	All applicable data on the current page is transmitted.
1	Display	Only data displayed on the screen is transmitted.

Field 24: Xmit LnDl

Transmit line delimiter. The line delimiter is selected in this field. The selected line delimeter is inserted at the end of each line when data transfer takes place.

0	LF	Select Linefeed code (0AH) as the line delimiter
1	CR	Select Carriage Return code (0DH) as the line delimiter
2	ETX	Select End-Of-Text code (03H) as the line delimiter

3	EOT	Select End-Of-Transmission code (04H) as the line delimiter.
4	Other	User programmed two byte line delimiter is used for the line delimiter

Field 25: Transfer Block Delimeter

This field selects the block delimeter for page data transfer. The block delimiter is inserted after all data is transferred to the host. The available selections are the same as line delimiters.

Field 26: Reserved for future use

4.3.5 Section 5 Setup Fields

This section consists of fields that are emulation dependent. Fields in this section are updated automatically when the emulation modes are changed. Depending on the current emulation mode, fields in this section have different meanings.

The meaning of each field in this section is listed for all three different modes separated by a "/". The first is for native or TVI-920 modes; the second applies DEC VT-100 or VT-52 mode; the last is for the DG-100/200 mode.

Field 27: Func Keys/LFNL Mode/Roll Mode

In native mode, this field selects the user function key mode. Available modes are:

0	Default	Function keys generate default codes
1	Program 1	Function keys generate user programmed code sequence 1
2	Program 2	Function keys generate user programmed code sequence 2
3	Word Star	Function keys generate WordStar function codes

In the VT-100 and VT-52 mode, Newline or Linefeed mode, available selections are:

0	Line Feed	The LF code moves the cursor to the next line without changing column position. Return key generates a CR code only.
1	New Line	LF code moves the cursor to the beginning of the next line. Return key generates a CR and a LF.

In D100/200 mode, this field determines the roll mode. When this field is set to "1", the roll mode is enabled. When set to "0", the roll mode is disabled. See section 9.1 for roll mode.

Field 28: Locl Edit/Curs Key/Reserved

In native and TVI-920 modes, the local edit mode can be enabled via this field. When this field is set to "1", the local edit mode is enabled. In local edit mode all cursor control keys, (directional arrows and home), operate in the local mode only, regardless of the terminal's communication mode.

In VT-100 and VT-52 mode, this field defines the cursor key mode. The value of "1" invokes the cursor key applications mode. The cursor key applications mode is disabled when this field is set to "0". See section 5.2.2 for codes generated by the cursor keys in each mode.

In the DG-100/200 mode, this field is reserved for future use.

Field 29: Attr Mode/Num Keys/Reserved

In the Native and TVI-920 mode, this field selects either hidden or embedded attribute modes. See section 6.3.3 for attribute modes. The embedded attribute mode is enabled if this field is set to "1", otherwise hidden attributes are enabled.

In VT-100 and VT-52 mode, this field determines the mode of the auxiliary numeric keypad. The applications keypad mode is enabled when this field is set to "1", otherwise the numeric keypad mode will be enabled. See section 5.2.4 for the codes generated by the auxiliary numeric keys in each mode.

In the DG-100/200 mode, this field is reserved for future use.

Field 30: P/L Attr/Norm Attr/Reserved

In the native and TVI-920 mode, this field defines the extent of the embedded attributes. (This field takes effect only when the Embedded attribute mode is enabled). When this field is set to "1", Line embedded attributes are enabled. Otherwise, Page embedded attributes are enabled. See section 6.3.3 for page/line attribute modes.

In VT-100 or VT-52 mode, this field specifies the character intensity with all the attributes off. When this field is set to "0", normal attribute has low intensity. A bold attribute is available in the visual attributes list. When it is set to "1", normal attribute has high intensity, and half intensity attribute can be selected in the visual attributes list.

In the DG-100/200 emulations mode, this field is reserved for future use.

Field 31: Auto LF/G0 Set/Reserved

In native and TVI-920 mode, this field determines the affect of the CR code. If this field is set to "1", auto linefeed is enabled and the CR code moves the cursor to the left margin of the next line. If the field is set to "0", auto linefeed is disabled and the CR code moves the cursor to the left margin of the current line.
In VT-100 and VT-52 mode, this field selects the primary character set. (See section 7.4.4 for the primary and secondary character sets.) The available values for this field are:

0	Default	Selects keyboard layout defined by field 11 of section 2.
1	U.K. Set	Selects U.K character set. The U.K set is identical to the ASCII set except that '#' character (ASCII 23H) is replaced by British pound sign .
2	Graphics	Selects special graphics set.
3	Mosaic	Mosaic character set which is triple size of normal characters. See chapter 10.5 for mosaic character programming.
4	Mult-N	Multinational character set.

When this field is set to values other than the default, the keyboard language mode selected in Field 17 does not have any effect. Instead, the keyboard assumes the standard layout. See appendix D and F for the graphics and multinational character sets.

In DG-100/200 mode, this field is reserved for future use.

Field 32: Reserved/G1 set/Reserved

In native and TVI-920 mode, this field is reserved for future use.

In VT-100 and VT-52 mode, this field selects the secondary character set. The selections are the same as the primary character set.

In DG-100/200 mode, this field is reserved for future use.

4.4 Status Line

The 25th line of the screen becomes the terminal status line when it is enabled. The status line contains information that may help the user determine the operational status of the terminal. To enable the status line, set field 5 of setup line B to "1". (Refer to section 4.3.1)

The status line format is shown in figure 4-3. The description for each field in the status line is as follows:

Field 1: Clock Display

The KT-7 terminal has a clock display, which is in this field of the status line. The first character in this field is A or P, representing AM or PM. The first two digits are the hour display and the following two digits are for the minute display.

Field 2: Terminal Ready

This field shows if the terminal is in a working state. Other possible messages are:

READY	Terminal is ready to receive data
FAIL	Terminal has failed. No data can be received or transmitted.
KB LOCK	Keyboard locked. Data from the host can be received but cannot be sent from the terminal keyboard.

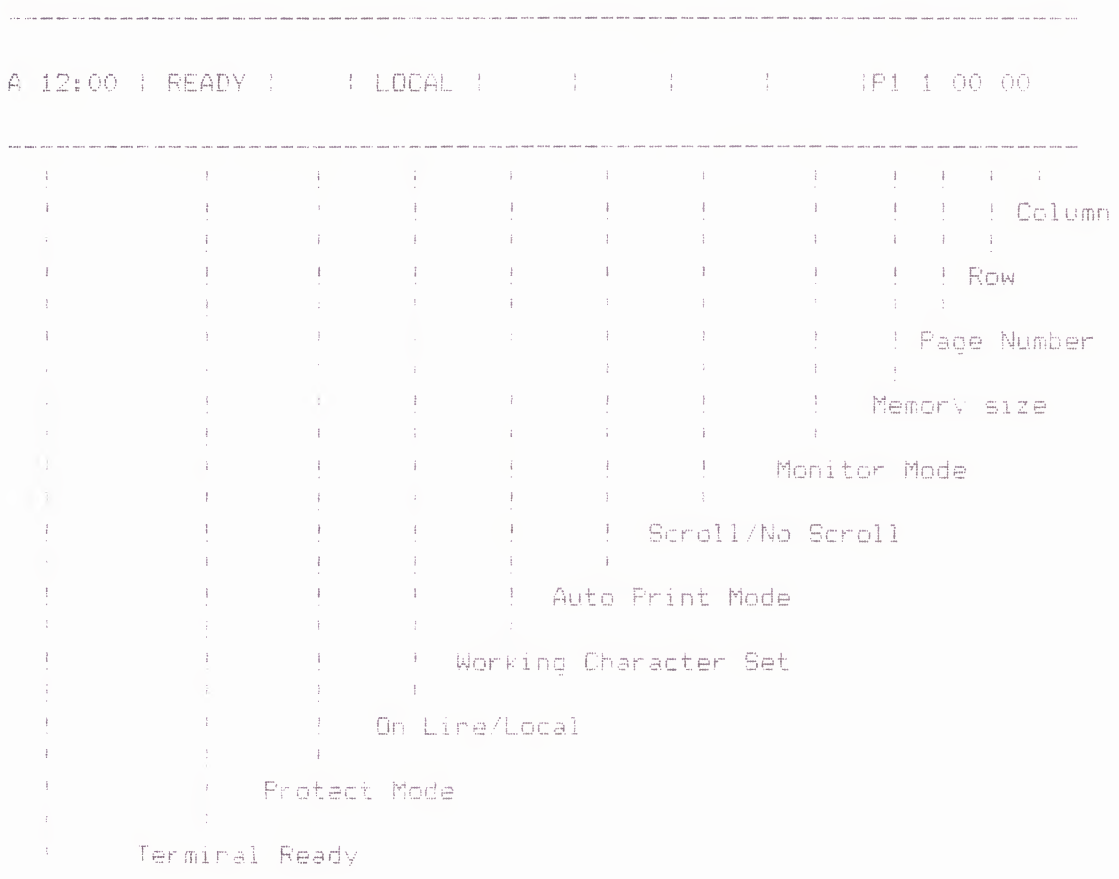


Figure 4-3. Status Line

Field 3: Protect Mode

When the protect mode is enabled, "PROTM" is displayed in this field. If not in the protect mode, this field stays blank.

Field 4: Online/Local Mode

The terminal is on-line with the host when "ONLINE" is displayed in this field. If the terminal is not on-line with the host, then "LOCAL" is displayed in this field. Press the Shift/Local key on the keyboard to toggle between on-line and local modes.

Field 5: Working Character Set

This field shows the working character set currently being used. Refer to section 6.3.4 for the available character sets and their selections. Messages likely to appear in this field and their meanings are:

BLANK	ASCII character set. Can be U.S., U.K., German, French, or Spanish, depending on the current setup of the international characters.
GRAPH	VT-7 special graphics character sets. See Appendix D for the Special Graphics Set.
MOSAIC	Mosaic character set, defined by CCITT S.100 standard. See Appendix E for the mosaic set.
MULTN	Multinational character set. It includes non-english European language letters. See appendix F for the multinational set.

Field 6: Auto Print Mode Message

When the auto print mode is enabled, a message is displayed in this field. Refer to section 6.10.2 for auto print mode. Possible messages and their meanings are as follows:

Blank	Auto print mode disabled.
P&D	Print and Display. Data received from the main port is displayed on the screen and sent to the auxiliary device at the same time.
PRT	Transparent Print. Data received from the host is sent to the auxiliary device without being displayed on the screen.
BID	Bidirectional Print. In this mode, the terminal can receive data from the device connected to the auxiliary port.

Field 7: No Scroll Message

No-Scroll mode. When the No-Scroll key on the keyboard is pressed, "NSCRL" is displayed in this field. This field remains blank normally.

Field 8: Monitor Mode Message

When monitor mode is enabled, this field displays "MONIT". The Monitor mode can be enabled by setting field 7 of setup line B. This field remains blank normally.

Field 9: Memory Size/Cursor Position Display

This field shows the installed display memory size and the current cursor position. The first digit after "P" designates the total memory size in the units of 2K bytes. The second digit is the current cursor position. The next four digits are the row and column numbers of the cursor.

Chapter 5 KEYBOARD OPERATIONS

This chapter provides information to properly operate the terminal from its keyboard. Each key function and code generated by it is described here. All keyboard generated codes are listed in subsequent tables for easy reference.

The KT-7 keyboard consists of an 83 key main keypad and a 16 key auxiliary numeric keypad. Each key has a unique function associated with it, and a unique code (or code sequence) is generated when each is pressed.

The function and meaning of each key may vary, depending on which emulation mode the terminal is in. The key functions in other emulation modes are described later on in this chapter. To learn about the key functions of a specific emulation mode, refer to the corresponding section for that emulation mode.

5.1 Native and TVI-920 Mode Operations

In Native and TVI-920 mode, the keys are divided into four different types, based on their functions and generated codes. They are:

i. Alphanumeric keys
ii. Control Function Keys
iii. Local Function Keys
iv. User Function Keys

The keyboard layout in the Native and TVI-920 mode is shown in the figure 5.1. The function of each key is described in subsequent sections.



Figure 5-1. KT-7 Keyboard Layout

5.1.1 Main Alphanumeric Keys

These keys include all keys on the keyboard marked with ASCII graphics character symbols. When pressed, these keys generate a single ASCII code corresponding to the ASCII character they are representing.

5.1.2 Control Function Keys

Control function keys include the following:

ESC, Back Space, Tab, BackTab, Del,
Return, Print/Nl, Line Feed, Enter Key.

When pressed, these keys generate ASCII control character or ESC sequence codes for specific control purposes. Their default functions and generated codes follow. During online mode operations, their functions may have different meanings depending on how they are interpreted by the host program. Refer to your software manual for the specific function of each key.

Table 5-1. Control Function Keys In Native And TVI-920 Mode

Key Name	Generated Codes	Function
ESC	1/11	Initiates ESC sequence command
Back Space	0/8	Moves the cursor one position to the left
Tab	0/9	Moves the cursor to the next tab position
Back Tab	1/11, 4/9	Moves the cursor to the previous tab position
DEL	7/15	Cancels the previously entered character.
Return	0/13	Moves the cursor to the first column of the line.
Print	1/11, 5/0	Sends screen data to the device connected to the auxiliary port.
Nl	1/15	Moves the cursor to the first character position of the next line
Line Feed	0/10	Moves the cursor to the next line. Maintaining the same column position.

Shift/ Line Feed	1/11,	6/10	Reverse Linefeed. Moves the cursor up one line in the same column position. This key is recognized in Native mode only.
Enter	0/13		Same as Return key.

5.1.3 Device Control Keys

The following keys are Device Control Keys:

Ctrl, Shift, Alpha Lock, Local,
Break, No Scroll, Ctrl/Home keys.

When pressed, these keys do not generate any codes. They perform functions to control the host, terminal, or keyboard.

Ctrl
Control key. Press this key in conjunction with other keys to generate a control code. See Appendix I for control codes generated by each key on the keyboard.

Shift
Shift key. This key performs the same function as the shift key on a typewriter. When pressed with another key at the same time, all keys generate their shifted position codes.

Alpha Lock
When pressed, all alphabetic character keys are locked into their upper case characters. To release Alpha Lock, press this key once more. Alpha Lock is enabled when the LED is on. If Alpha Lock is activated via the setup mode, this key will not have any effect. See Appendix G for the codes generated by each key when Alpha Lock is enabled.

Local
Toggles the local/on-line mode. If pressed while the terminal is in on-line mode, it puts the terminal into local mode. If the terminal is in the local mode, pressing this key will enable the on-line mode. In local mode, each character or character sequence is stored in the data space, just as in the block mode, but communication with the host is disabled.

Break
This key generates a standard 240 millisecond break pulse on the transmit data line of the main port. This key is generally used to reset the user station. This key may be disabled in the setup mode B. When disabled, this key does not have any affect.

No Scroll
This key disables data update on the screen from the host. All incoming data is stored in the buffer until the buffer is full. When the buffer is full, a transmit-off code is generated by the

terminal. See section 3.3 for the transmit-off code. To enable the screen update, press this key once more.

Ctrl/Home
When the keyboard is locked, this key unlocks it. If pressed while the keyboard is unlocked, this key will not have any effect.

5.1.4 User Function Keys

The 20 grey colored keys on the top row of the keyboard are the user function keys. The functions and codes generated by these keys are determined by the user function key mode selected in setup mode B. Refer to section 4.3.5 for selecting the function key mode. The user function keys may be in one of the following modes:

Default Mode
Program Level 1 mode
Program Level 2 Mode
WordStar Mode

In default mode, the functions and codes of these keys are as follows. (The specific function of each key during online operation may be different depending upon your application. Refer to your software manual for the specific function of each key.)

Table 5-2. Codes Generated in Default Function Key Mode

Key Name		Generated Codes	Functions
Xmit	Norm	1/11, 3/7	Sends screen data to the host.
	Shft	1/11, 3/6	Sends the line the cursor is located to the host from first column to the cursor position.
F1	Norm	0/1, 4/0, 0/13	No intrinsic function. The meaning
	Shft	0/1, 6/0, 0/13	
F2	Norm	0/1, 4/1, 0/13	of these are decided by the host
	Shft	0/1, 6/1, 0/13	
F3	Norm	0/1, 4/2, 0/13	application program. (Refer to your
	Shft	0/1, 6/2, 0/13	
F4	Norm	0/1, 4/3, 0/13	software manual.)
	Shft	0/1, 6/3, 0/13	
F5	Norm	0/1, 4/4, 0/13	
	Shft	0/1, 6/4, 0/13	
F6	Norm	0/1, 4/5, 0/13	
	Shft	0/1, 6/5, 0/13	
F7	Norm	0/1, 4/6, 0/13	
	Shft	0/1, 6/6, 0/13	
F8	Norm	0/1, 4/7, 0/13	
	Shft	0/1, 6/7, 0/13	

F9	Norm	0/1, 4/8, 0/13	
	Shft	0/1, 6/8, 0/13	
F10	Norm	0/1, 4/9, 0/13	
	Shft	0/1, 6/9, 0/13	
Cursor Up		0/11	Moves the cursor up one line.
Cursor Down		1/6	Moves the cursor down one line.
Cursor Left		0/8	Moves the cursor one position to the left.
Cursor Right		0/12	Moves the cursor one position to the right.
Home	Norm	1/14	Moves the cursor to the home position. (Home position is top left corner of the screen.)
	Shft	1/10	Clears the whole screen.
Ins Char		1/11, 5/1	Creates a blank space at the current cursor position. See section 6.5.1 for the insert character command.
Del Char		1/11, 5/7	Deletes the character the cursor is positioned over. All data from the cursor position to the end of the field (line) is moved one position to the left.
Ins Line		1/11, 4/5	Creates a blank line on the cursor line. Same function as Insert Line See section 6.5.1.
Del Line		1/11, 5/2	Deletes the line where the cursor is currently positioned. All lines of text below deleted line are moved up a line.
Erase Eop		1/11, 5/9	Erases from the current cursor position to the end of the page.
Erase Eof		1/11, 5/4	Erase from the cursor to the end of the current line (or field).
Clear Tab		1/11, 3/2	Clears the tab at current location.
Set Tab		1/11, 3/1	Sets the tab at current location.

In Program Level 1 and Level 2 modes, the user function keys generate codes previously programmed for each level by the user. See section 10.1 for the function key programming sequences.

In the **WordStar** Mode, the user function keys generate codes for WordStar commands. The codes generated for each key are shown in table 5-3. Refer to the WordStar manual for the detailed functional operations of each command.

Table 5-3. Codes Generated in WordStar Function Key Mode

Key Name		Generated Codes	WordStar Functions
Xmit	Normal	None	None
	Shift	None	None
F1	Normal	CTRL/J, H	Set help level
	Shift	None	
F2	Norm	CTRL/Q, F	Find
	Shft	CTRL/Q, A	Find and Replace
F3	Norm	CTRL/K, B	Start block
	Shft	CTRL/K, K	End block
F4	Norm	CTRL/K, V	Move block
	Shft	CTRL/K, C	Copy block
F5	Norm	CTRL/K, Y	Delete block
	Shft	CTRL/K, W	Write block
F6	Norm	CTRL/O, L	Set left margin
	Shft	CTRL/O, R	Set right margin
F7	Norm	CTRL/O, I	Set tab
	Shft	CTRL/O, N	Clear tab
F8	Norm	CTRL/O, C	Center line
	Shft	CTRL/O, S	Set line spacing
F9	Norm	CTRL/K, D	Save file
	Shft	CTRL/K, Q	Abandon file
F10	Norm	CTRL/Z	Scroll up
	Shft	CTRL/W	Scroll down
Cursor Up	Norm	CTRL/E	Cursor up
	Shft	CTRL/R	Screen up
Cursor Down	Norm	CTRL/X	Cursor down
	Shft	CTRL/C	Screen down
Cursor Left	Norm	CTRL/S	Cursor left
	Shft	CTRL/F	Word left

Cursor Right	Norm	CTRL/D	Cursor right
	Shft	CTRL/A	Word right
Edt 1	Norm	CTRL/V	Insert character
	Shft	CTRL/G	Delete character
Edt 2	Norm	CTRL/N	Insert line
	Shft	CTRL/Y	Delete line
Edt 3	Norm	None	
	Shft	None	
Edt 4	Norm	CTRL/O I	Tab set
	Shft	CTRL/O N	Tab clear

5.2 DEC VT-100 and VT-52 Mode Operations

In DEC VT-100 or VT-52 mode, the keyboard is fully compatible with the DEC VT-100 keyboard, and includes additional keys for enhanced operations. In the DEC mode, keys are classified into the following groups:

i. Main alphanumeric keys
ii. Local function keys
iii. Control function keys
iv. Programmable function keys
v. Numeric keypad
vi. User function keys

The functions and codes of the main alphanumeric keys and the local function keys are the same as in the Native mode. For those keys, refer to the preceding section.

5.2.1 Control Function Keys in VT-100/VT-52 Mode

The control function keys include the following:
ESC, Back Space, Tab, Back Tab,
Del, Print, Nl, Linefeed

Their functions and codes generated in the VT-100 mode are listed in the Table 5-4. The codes generated in the VT-52 mode are listed in Table 5-5. The function of each key is the same in both VT-100 and VT-52 modes. The specific function of each key during on-line operation is determined by the host application program. Refer to your software manual for the specific meanings of each key during on-line operations.

Table 5-4. Control Function Keys in VT-100 Mode:

Key Name	Generated Code	Functions
ESC	1/11	Initiates the ESC sequence
Back Space	0/8	Moves the cursor one position to the left.
Tab	0/9	Moves the cursor to the next tab position.
Del	7/15	No intrinsic meaning to the terminal. May be used by the host to cancel the previously entered character.
Back Tab	1/11, 5/11, 5/10	Moves the cursor to the preceding tab position.

Print	1/11, 5/11, 6/9	Sends screen data to the device connected to the auxiliary port.
NL	1/15	Moves the cursor to the first character position of the next line.
LF	0/10	Moves the cursor one line down.
Shift/ LF	1/11, 4/13	Reverse index. Moves the cursor one line up.

Table 5-5 Control Function Keys in VT-52 Mode

Key Name	Generated Code	Key Name	Generated Code
ESC	1/11	Back Tab	1/11, 5/4
Back Space	0/8	Print	1/11, 5/0
Tab	0/9	Shift/LF	1/11, 4/9
Del	7/15		

5.2.2 Cursor Keys

These are the arrow keys and the Home key located on the top row of the keyboard. These keys generate the code sequences listed in Table 5-6. The function of these keys is to move the cursor; however, the meaning of these keys may be changed in your application program. Refer to your software manual for the specific meaning of these keys during the on-line mode operations.

Table 5-6. Cursor Key Codes

Key Name	VT-52 Mode	VT-100 Mode and Cursor Mode Reset	VT-100 Mode and Cursor Mode Set
Up	ESC A	ESC [A	ESC O A
Down	ESC B	ESC [B	ESC O B
Right	ESC C	ESC [C	ESC O C
Left	ESC D	ESC [D	ESC O D
Home	ESC H	ESC [H	ESC O H

5.2.3 Programmable Function Keys

The programmable function (PF) keys are the four grey keys at the top of the numeric keypad. These keys generate the same codes as VT-100 PF keys. The code generated by these keys does not have any meaning to the terminal itself. The functions of these keys may vary depending on the software run by the host. Refer to your software manual for specific functions performed by each key during on-line operation. The codes generated by these keys are listed in Table 5-7.

Table 5-7. PF Key Codes

Key Name	VT52 Mode	VT-100 Mode
PF1	ESC P	ESC O P
PF2	ESC Q	ESC O Q
PF3	ESC R	ESC O R
PF4	ESC S	ESC O S

5.2.4 Numeric Keys

Numeric keys are those located on the auxiliary keypad, except PF keys. In the numeric mode, numeric keys generate normal ASCII codes. In the applications mode, these keys generate special code sequences. The numeric/applications keypad mode can be set or reset via setup mode B (see section 4.3.5). Refer to your software manual for the function of each key while the terminal is in the applications keypad mode.

Table 5-8. Numeric Key Codes

Key Name	Numeric Mode	Applications Mode, VT-52	Applications Mode,VT-100
0	0	ESC ? p	ESC O p
1	1	ESC ? q	ESC O q
2	2	ESC ? r	ESC O r
3	3	ESC ? s	ESC O s
4	4	ESC ? t	ESC O t
5	5	ESC ? u	ESC O u
6	6	ESC ? v	ESC O v
7	7	ESC ? w	ESC O w
8	8	ESC ? x	ESC O x
9	9	ESC ? y	ESC O y
-	-	ESC ? m	ESC O m
,	,	ESC ? l	ESC O l
.	.	ESC ? n	ESC O n
Enter	CR	ESC ? M	ESC O M

5.2.5 User Function Keys

In VT-100 or VT-52 mode, there are 10 user programmable function keys available, F1 through F10. When pressed, these keys generate program Level 1 codes (previously programmed by the user). Level 2, default, and WordStar codes are not available in DEC emulation modes. See section 10.1 for the function key programming procedure.

In addition to ten user function keys, the Alt and Cmd keys may be used as user function keys. To use these keys as user function keys, the Alt/Cmd field in the setup mode B should be enabled.

5.3 DG-200 Mode Operations

In the DG mode, keys are classified into the following groups:

i. Alphanumeric keys
ii. Control Function Keys
iii. Local Control Keys
iv. DG function keys

The functions and generated codes of alphanumeric and local control keys are the same as in the native mode. (Refer to section 5.1.1.)

5.3.1 Control Function Keys

The control function keys are located on the main keypad and generate specific control or escape sequences. The keys and their generated codes are listed in Table 5-9.

Table 5-9 Control Function Keys in DG Mode

Key Name	Code	Function
ESC	1/11	Initiates ESC sequence
Back Space	1/9	Moves the cursor one position to the left.
Tab	0/9	Moves the cursor to the next tab position.
Back Tab	1/11, 5/11, 5/10	Moves the cursor to the previous tab position.
Del	7/15	No meaning to the terminal. May be used by the host to cancel previously entered character.
Print	1/1	Sends the screen data to the device connected to the auxiliary port.
NL	0/10	New Line. Moves the cursor to the first column of the next line.
LF	1/10	Linefeed. Moves the cursor down one line within the same column.

5.3.2 User Function Keys

In DG-100/200 mode, programmable function keys are not available. Instead, the KT-7 terminal generates function codes that are fully compatible with DG D100/200 terminals. However, due to the differences in the keyboard layouts, it does not fully emulate the key stroke sequences of D100/200 terminals. The key strokes that cannot be emulated are logically mapped according to the following rule:

i. (Shift/Ctrl/Key) strokes on the DG keyboard are replaced by (CMD, key) sequences on the KT-7 keyboard.

ii. (CMD/Key) strokes are also replaced by (CMD, key) sequences.

iii. F11 through F15 in DG terminals are replaced by (ALT, Cursor Up) through (ALT, Cursor Home) sequences.

Note: The keys separated by a "/" are to be pressed at the same time, while keys separated by a "," are to be pressed sequentially.

The resulting keyboard mapping is shown in Table 5-10.

Table 5-10 Keyboard mapping between the DG terminal and the KT-7 terminal.

DG200 keyboard	KT-7 keyboard
F1 ... F10	F1 ... F10
S/F1 ... S/F10	S/F1 ... S/F10
Ctrl/F1 ... Ctrl/F10	Ctrl/F1 ... Ctrl/F10
S/Ctrl/F1 ...S/Ctrl/F10	(CMD,F1) ... (CMD,F10)
F11 ... F15	(ALT,CurUp)... (ALT,CurHome)
S/F11... S/F15	(ALT,S/CurUp)...(ALT,S/Curhome)
Ctrl/F11 ... Ctrl/F15	(ALT,Ctrl/CurUp)...(ALT,Ctrl/CurUp)
S/Ctrl/F11...S/Ctrl/F15	(ALT,CMD,CurUp)...(ALT,CMD,CurHome)
CMD/S/Print	CMD, S/Print
S/MODE/Home	CMD, S/Home
CMD/Print	CMD, Print
S/CurUp...S/CurDown	S/CurUp ... S/CurDown
C1 ... C4	Edt1 ... Edt4
S/C1 ... S/C4	S/Edt1 ... S/Edt4

All DG function keys generate two code sequences, one byte function code preceded by an RS code (ASCII 1/14). Figure 5-2 shows the function code generated by the function keys. The codes are represented in their octal ASCII values.

F1 Through F10 Function Keys

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
Command,	41	42	43	44	45	46	47	50	51	52
Control/	61	62	63	64	65	66	67	70	71	72
Shift/	141	142	143	144	145	146	147	150	151	152
Normal/	161	162	163	164	165	166	167	170	171	172

Cursor Keys

	Up	Down	Left	Rght	Home
ALT, CMD,	53	54	55	56	40
ALT, C/	73	74	75	76	60
ALT, S/	153	154	155	156	140
ALT,	173	174	175	176	160
Normal/	27	32	31	30	
CMD, S/					10

Edt Keys

	Edt1	Edt2	Edt3	Edt4
S/	130	131	132	133
Norm	134	135	136	137

Print Key

CMD, S/	01
CMD,	21

Figure 5-2 Function Key Codes Generated in DG Mode

CHAPTER 6 NATIVE AND TVI-920 MODE OPERATION COMMANDS

This chapter describes all the remote operations commands to control terminal operations in the Native and TVI-920 mode. Using the commands described in this chapter, the user can control and program the terminal from the host or from the keyboard. Commands described in this chapter are not valid in other emulation modes. The operations commands for a given function may differ depending on the current emulation mode.

In addition to operations commands described in this chapter, there are common operations commands that can be accessed in all emulation modes including Native and TVI-920 mode. These common operations commands are for systems programming, tabular graphics, and clock controls. They are explained in chapter 10.

6.1 Control Characters

Control characters are ASCII characters with values from 0/0 to 1/15. In the native mode, the KT-7/S terminal recognizes control characters listed in Table 6-1. Control characters that do not appear in this table are ignored by the terminal.

Table 6-1 Control Characters Recognized by the KT-7 Terminal in the Native and TVI-920 Mode.

Name	ASCII Value	Functions
ENQ	0/5	Answerback Request. When received, the terminal sends an answerback message to the host.
BEL	0/7	Rings the margin bell.
BS	0/8	Back Space. Moves the cursor one position to the left.
HT	0/9	Horizontal Tab. Moves the cursor to the next tab position.
LF	0/10	Linefeed. Moves the cursor down one line.
VT	0/11	In native mode, this code moves the cursor one line up. In TVI-920 mode, this code has no effect.
FF	0/12	Moves the cursor one position to the right.
CR	0/13	Carriage return. Moves the cursor to the beg-gining of the line.

DC1	1/1	X-off code. See section 3.3.1 for X-on/off operations. Ignored when received by the terminal.
DC3	1/3	X-on Code. See section 3.3.1 for X-on/off operations. Ignored when received by the terminal.
SYN	1/6	Cursor down.
ESC	1/11	Escape lead-in character. Initiates all ESC sequence commands.
RS	1/14	Cursor Home.
US	1/15	Newline. Moves the cursor to the beginning of the next line.

6.2 Cursor Control Commands

This section describes commands pertaining to cursor movement control in Native and TVI-920 emulation modes.

Cursor Up CTRL/K

This command moves the cursor up one line. The column position is not affected by this command. In Native mode, this command will not have any effect when the cursor is on the top row of the page. In the TVI-920 mode, the page scrolls down one line and new blank line appears on the top row. Data on the bottom row of the page is lost.

Cursor Down Native Mode CTRL/V
920 Mode CTRL/J

When received, this command causes the cursor to move down one line. Column position is not effected. If the cursor is at the bottom of the screen, this command will not have any effect. Use CTRL/J instead in 920 mode.

Cursor Left CTRL/H

This command causes the cursor to move one position to the left. If the cursor is at the column farthest left, the cursor goes to the far right column of the preceding line.

Cursor Right CTRL/L

This command moves the cursor one position to the right. If the cursor is in the far right column, the cursor moves to the far left column of the next line.

Cursor Home CTRL/

This command moves the cursor to the home position. The home position is the top left corner of the page.

Carriage Return CTRL/M

This command moves the cursor to the first column of the current line. If the Auto Linefeed mode is enabled, this code will move the cursor to the first column of the next line.

Linefeed CTRL/J

This command moves the cursor down one row without changing the column position. If the cursor is at the bottom of the page, the page will scroll up one line and a new blank line will be created along the bottom row. The data on the top row is lost. If auto paging is enabled, this command will cause a new page to appear when the cursor is at the bottom of the current page.

Cursor Addressing ESC = <row> <col>

This command moves the cursor to the position within the current page specified by <row> and <col> code. <row> and <col> are ASCII codes that specify the new cursor row and column position. The new row and column numbers are determined by subtracting 20H, (32 in decimal), from the ASCII value of <row> and <col> code, respectively. See Appendix G for <row> and <col> codes and the row/column numbers that they represent.

Cursor Addressing ESC - <page> <row> <col>

This command moves the cursor to the position specified by <row> and <col> in the page specified by <page>. The <page> code is a single byte ASCII character '0' through '3' used to specify the page numbers 1 through 4. The <row> and <col> codes are used as shown in the preceding section.

Auto Linefeed On ESC 8

If Auto Linefeed is enabled, the terminal performs linefeed functions followed by a carriage return when the CR (0/13) code is received.

Auto Linefeed Off ESC 9

This command turns the Auto Linefeed mode off.

Auto Wrap On ESC ~

This command enables the auto wrap mode. While the auto wrap mode is enabled, the cursor moves to the first column of the next line when it reaches the end of the current cursor line.

Auto Wrap Off ESC O

Disables the auto wrap mode. The cursor reaches the end of line and stays there until a cursor control command is received.

Auto Page On ESC v

Enables the auto paging. The cursor moves to the top of the next page or bottom of the previous page when it reaches the page margin.

Auto Page Off ESC w

Disables auto paging. The cursor stays within the current page until an explicit page change command is received. When the cursor reaches the top or bottom margin of a page, the page is scrolled in the respective direction to create a blank line.

6.3 Display Controls

This section describes commands that control display characteristics.

6.3.1 Screen Attributes

Bright Background On ESC b
Off ESC d

When the bright screen background is on, the characters are displayed dark on a bright background. When the bright background is off, the characters are displayed bright on the normal dark background.

Screen On ESC O
Off ESC N

When the screen is off, the display goes blank. The screen should be left on for normal operations. This command is available in Native mode only.

6.3.2 Cursor Attributes

Cursor Attributes ESC . <Sel>

This sequence defines the shape of the cursor. <Sel> is an ASCII character from "0" through "5" and selects the cursor shape as follows.

ESC . 0	Invisible Cursor
ESC . 1	Blinking Block
ESC . 2	Steady Block
ESC . 3	Blinking Underline
ESC . 4	Steady Underline

6.3.3 Video Attributes

The KT-7 terminal provides video attributes that can be used to emphasize or downplay data displayed on the screen. Attributes available are reverse video, underline, blink, invisible, and half intensity.

Hidden / Embedded Attribute Mode

The video attributes of the KT-7 terminal can be selected either to take up a character space or not to take up a character space when the video attributes are enabled. These are termed embedded and hidden attribute modes. The attribute mode is selected via the setup mode. Refer to section 4.3.5.

If hidden attributes are selected, setting or clearing attributes will not require a character space on the screen and all attributes will be character attributes; that is, video attributes will be shown along with a character entered. If embedded attributes are selected, setting or clearing all attributes, other than half intensity, will require a character space on the screen to be occupied by an attribute character. Attribute characters are displayed as blank spaces on the screen.

Line/Page Attribute Mode

This mode is selected via setup mode B. If line attribute is selected, attributes will be visible as soon as they are activated from the activating position to the end of the line or to the next attribute character, whichever is first. Selecting page attribute, attributes will be visible from the activating position to the end of page or to the next attribute character, whichever is first.

Attribute Controls

The escape sequence commands to set or clear video attributes are shown below in Table 6-2.

Table 6-2. Video Attribute Commands

VIDEO ATTRIBUTES	NATIVE	920
Normal screen	ESC G 0	ESC q
Blank screen	ESC G 1	ESC p
Blinking on	ESC G 2	ESC ^
Invisible blink (end blink)	ESC G 3	
Start reverse video	ESC G 4	ESC j
End reverse video	ESC G 5	ESC k
Reverse blinking on	ESC G 6	
Reverse blinking off	ESC G 7	
Underline on	ESC G 8	ESC l
Underline off	ESC G 9	ESC m
Underline blink on	ESC G :	
Invisible underline blank	ESC G ;	
Underline reverse on	ESC G <	
Invisible underline blank	ESC G =	
Underline reverse blink	ESC G >	
Invisible underline reverse blink	ESC G ?	
Half intensity on	ESC)	ESC)
Half intensity off	ESC (	ESC (

6.3.4 Graphics Mode and Character Set Selection

In the KT-7 terminal, there are five different character sets available: U.S. ASCII, U.K., special graphics, mosaic, and a multinational character set. Any of these sets can be assigned to two character set buffers, G0 and G1. Once a character set is assigned to one of the working buffers, it can be activated by shifting into the G0 set or by shifting out of the G1 set.

Assign a Character Set to G0 ESC CTRL/X <sel>

Assigns the character set selected by <sel> to the G0 buffer. <sel> is an ASCII character and selects a character set as follows:

<sel> = 0	Special graphics set
<sel> = 1	Multinational set
<sel> = 2	Mosaic set
<sel> = A	U.K. international set
<sel> = B	U.S. ASCII set

Assign a Character Set to G1 ESC CTRL/Y <sel>

Assigns the character set selected by <sel> to G1 buffer. <sel> is an ASCII character which selects the character set as in the previous section.

Select Active Buffer ESC CTRL/Z <sel>

Select either G0 or G1 as the active set. <sel> is an ASCII character which selects G0 or G1 as follows:

<sel> = 0	G0 set is active
1	G1 set is active

Graphics Mode On ESC $

Off ESC %

These commands temporarily activate or deactivate the special graphics character set without effecting the current character set assignment of G0 and G1. When the new character set is assigned to either G0 or G1, or a working set is selected by shift-in or shift-out command, the graphics set selected/deselected by this command is cancelled.

In graphics mode, characters are not displayed as ASCII symbols. Instead, they are displayed as corresponding special graphics symbols. See Appendix D for graphics symbols and their ASCII values.

6.3.5 Monitor Mode

Monitor Mode On ESC U

Off ESC u or ESC X

In monitor mode, all ASCII characters, including control characters, are displayed as graphics symbols. The control and remote command sequences can be monitored since they are visually

displayed and do not invoke any function on the terminal. This may provide useful clues in debugging the screen managing programs.

6.3.6 25th Line

The 25th line of the KT-7 terminal can be used to display either the terminal status line, a user message, or it may be left as a blank line.

Display Status Line **ESC h**
This displays the terminal status information on the 25th line of the screen. The status line is displayed in reverse video.

Display User Message **ESC g**
This displays a user message on the 25th line of the screen. This message is displayed in reverse video.

Disable 25th Line **ESC e**
No 25th line is displayed.

6.4 Page Controls

Define Page Size **ESC \ <size>**
This command defines the page size in terms of number of lines. <size> is determined by an ASCII character from "1" to "3" and defines the page length as follows:

ESC \ 1	24 lines per page
ESC \ 2	48 lines per page
ESC \ 3	96 lines per page

The total number of available pages is automatically determined based on the page size and the total number of lines available. The following table shows the relationship between page length and the total number of pages available for use.

Table 6-3. The Page Size Available by the Installed Memory

Installed Memory	2K	4K	8K
24 lines per page	1	2	4
48 lines per page	-	1	2
96 lines per page	-	1	1

"-" entry in above table indicates an incorrect value. When an unavailable value is selected, it will default to the highest available value within the same column. For example, if 96 lines per page is selected and the terminal has only 48 lines available, the page size will be set to 48 lines.

Page Advance ESC K

This command moves the cursor to the next page. The current cursor position is saved by the terminal and the last cursor position in the new page is restored. If the cursor is on the last page, this command moves it to the first page. If the terminal has only one page installed, this command is ignored.

Page Reverse ESC J

This command moves the cursor to the previous page. The current cursor position is saved by the terminal and the last cursor position in the new page is restored. If the cursor is on the first page or if the terminal has only one page installed, this command is ignored.

6.5 Screen Editing

This section describes commands that can be used to edit on-screen text. These functions are text insert/delete and text erase.

6.5.1 Text Insert/Delete

Insert Character ESC Q

When this command is received, all data to the right of and including the cursor is shifted one position to the right, creating a blank space at the cursor position. Any character in the last column of the line is lost.

Delete Charater ESC W

This command deletes the character at the current cursor position. All data to the right of and including the cursor on the current line is shifted one position to the left and a blank space is created at the end of the line.

Insert A Line ESC E

This command inserts a new blank line at the current line. All data at and below the cursor line is moved down one line and a blank line is created where the cursor is located. The data at the bottom of the page is lost.

Delete A Line ESC R

This command deletes the line where the cursor is currently located. All data below the cursor is moved up one line and a blank line is created at the bottom of the page.

6.5.2 Erase Text Functions

Clear Page With Spaces ESC +

In the Native operations mode, upon receiving this command all unprotected text within the page is cleared and replaced with space (code 2/0). If dim attribute is enabled, the screen is cleared with dim spaces. In 920 mode, all text including protected data is cleared and replaced with space. Also, the protect mode is reset.

Clear All to Nulls ESC *

Clears the page with null codes. This command also turns off the protect mode and dim attribute if they are enabled.

Clear Page With Dim Space ESC ,

This command is only available in the Native mode. This clears the unprotected text in the current page and replaces it with dim space.

Clear Page With Nulls ESC :

Clears the unprotected text page with nulls. The page is cleared with dim null if the dim attribute is enabled.

Clear Page With Spaces ESC ; or CTRL/Z

This command also clears the unprotected text in current page with space. The page will display dim space if the dim attribute is enabled.

Erase Line to Spaces ESC T

Erases data from the cursor to the end of the line. (Or to the end of the current unprotected field.) The erased data is replaced by space codes (20H). If the dim attribute is on, the erased text is replaced with dim space.

Erase Line to Nulls ESC t

Erases data from the cursor to the end of the line or end of the current unprotected field, whichever is shorter. The erased data is replaced by null codes (00H). If the dim attribute is on, the erased data will be replaced by half intensity nulls.

Erase Page to Spaces ESC Y

Erases all unprotected data from the cursor to the end of the page. The erased data is replaced by space codes (20H). If dim attribute is on, the erased data is replaced with dim spaces.

Erase Page to Nulls ESC y

Erases unprotected data from the cursor to the end of the page. The erased data is replaced by null codes (00H). If half intensity is on, the erased data is replaced with half intensity spaces.

6.5.3 Insert Mode

Insert Mode On ESC Z
Insert Mode Off ESC r

When the insert mode is activated, all data from the cursor to the end of field, (end of the line, no protected field), is moved one position to the right as a character is entered at the cursor position. Any character in the far right column is lost.

6.6 Tabs and Margin Bell

This section describes the commands used to control tab and margin bell. Commands covered in this section are: forward tab, back tab, setting/resetting the tab position, and setting/resetting margin bell position.

Forward Tab CTRL/I

Moves the cursor to the next tab stop. If there are no tab stops ahead, this command is ignored. If the protect mode is enabled, this command has the same effect as the field tab.

Field Tab ESC i

This command is valid only when the protect mode is enabled. If the protect mode is not enabled, this command is ignored. This command moves the cursor to the beginning of the next unprotected field. If there are no unprotected fields ahead, the cursor returns to the first unprotected field in the page.

Back Tab ESC I

In unprotected mode, this command moves the cursor to the previous tab stop. If there are no remaining tab stops, the cursor goes to the beginning of the line. If the cursor is at the beginning of the line, this command does not have any effect.

In protected mode, this command moves the cursor to the beginning of the previous unprotected field. If the cursor is at the first unprotected field of the page, this command has no effect.

Tab Set ESC 1

This command sets the tab stop at the current cursor position. In the protect mode, this command creates a column of half intensity spaces from the cursor position to the end of the page.

Tab Clear ESC 2

This command clears the tab stop at the current position. (Tab stops at other columns are not affected.) In protected mode, this command is ignored.

Tab Clear All ESC 3

This command clears all tab stops. In protected mode, this command is ignored.

Margin Bell Set ESC o
Clear ESC n

This command sets the margin bell at the current cursor position. The margin bell at the old position is cleared automatically. (There is only one margin bell position at any time.) The clear command resets margin bell.

6.7 Protect Mode Operations

The protect mode allows designated areas, (protected fields), on the screen to be guarded from being modified or destroyed. The protect mode may be used to create forms on the screen, and the operator may enter data only on pre-determined data entry fields.

Creating Protected Fields

The procedure for setting up a protected data field is the same as writing data with half intensity attributes. See section 6.3.3 for writing data with half intensity attributes. The data entered with half intensity is not protected until the protect mode is enabled.

Protect Mode Enable ESC &
Disable ESC '

When the protect mode is enabled, half intensity data is protected and cannot be updated. The cursor cannot enter the protected fields. When the cursor comes to a protected field, it skips over it and moves to the next unprotected field. In protect mode, editing functions may have different effects. Differences are explained throughout this manual wherever applicable.

When the protect mode is disabled, normal operation resumes and data on the screen may be updated again.

6.8 Systems Test and Reset

Fill Screen With H ESC F

This command fills the screen with the character "H". This feature is used for aligning the screen.

6.9 Data Communications with the Host

The KT-7 terminal can also operate in several different modes of communication with the host. Communication modes and their operations are described in this section.

6.9.1 Communication Modes

The KT-7S terminal can communicate with the host in several different modes. This section describes the communication modes in the Native or TVI-920 operation mode and the commands to control them.

Enable Block Mode ESC B

This command enables the terminal for block mode operations. In the block mode, data entered from the keyboard is displayed on the screen without being sent to the host. Screen data is sent to the host only when the transmit command is received from the keyboard or the host. From the keyboard, the user may enter the command sequence or press the Xmit key.

Data received from the host is displayed on the screen normally. This mode may be selected via the setup mode instead of the remote command sequence.

Enable Conversation Mode ESC C

In the conversation mode, any character entered from the keyboard is sent to the host directly. The entered character may also be sent to the screen if local echo or half duplex is enabled.

Enable Half Duplex (Local Echo) ESC {

When half duplex is enabled and if the terminal is in the conversation mode, data entered from the keyboard is sent to the host and displayed on the screen at the same time. The host should not echo back the character entered from the terminal (full duplex). If echoed from the host, (full duplex enabled), characters entered would be displayed twice. While the terminal is in block mode, the half duplex mode will not have any effect.

Enable Full Duplex ESC }

When full duplex is enabled, the local echo function is disabled. In conversation mode, data entered from the keyboard is sent to the host only and not displayed on the screen. For characters entered from the keyboard to be displayed on the screen, the host should echo the data back to the terminal. Full duplex operation is ignored when the terminal is in block mode.

6.9.2 Block Data Transfer to the Host

This section describes block data transfer commands and their operations. In block mode, no data is transferred to the host until a transmit data command is received from either the host or the keyboard. The amount of data transferred varies according to the command and transfer boundary modes.

At the end of each line and each transmission, a line delimiter is inserted to designate the end of the line. Also, at the end of the transfer, an end of transmit delimiter is sent to the host. Delimiter codes may be selected by the user via the setup mode.

The transfer boundary is selected via the setup mode. (Refer to section 4.3.4 for boundary selection.) When the page boundary is selected, the page transfer command transfers data from the top of the page. If the display boundary is selected, only the data within the current display screen is transferred.

Send Line Unprotected ESC 4

Initiates transfer of data from the beginning of the current cursor line through to the cursor position . If the protect mode is enabled, only unprotected data will be transmitted. Protected fields are replaced by an FS (0/12) code. If no protect modes are enabled, all data is transmitted.

Send Page Unprotected ESC 5

Upon receiving this command, data from the beginning of the display (or page) to the cursor position is transferred to the host. If the protect mode is enabled, only unprotected data is sent. All protected fields are replaced by FS (0/12) codes. If the protect mode is not selected, all data is sent to the host.

Send Line All ESC 6

This command initiates the transfer of data from the beginning of the cursor line to the current cursor position. All data, protected or unprotected, is sent.

Send Page All ESC 7

This command directs the terminal to send all data from the beginning of the display (or page) to the cursor position. All data, protected or unprotected, is sent.

Send Message Unprotected ESC S

Sends all unprotected data from the start of text (STX) to the end of text (ETX) codes on a screen page. If the start of text code is missing on a page, default is home position: if the end of text code is missing, ending position is set to end of page by default. FS(0/12) code is sent in place of protected field.

Send Message All ESC s

This command functions same as Send Message Unprotected except that the total message, regardless of protected or unprotected, is sent.

6.9.3 Transfer Delimiters

Various transfer delimiters are used to delimit the boundaries of fields and data types. There are two different types of delimiters: transfer boundary delimiters and data type delimiters. All delimiters described in this section apply to all emulation modes, as well as Native and TVI-920 modes.

Transfer boundary delimiters consist of two delimiters: end of line and end of transfer delimeters. At the end of each line the line delimeter is sent to the host designating the end of the line. At the end of the data transfer, an end of transfer delimiter is sent to the host to designate that there is no more data to be transferred. (The line delimiter is not used in the last line.)

Transfer boundary delimiter codes are selected via the setup mode. See section 4.3.4 for selecting the delimeter codes. Delimiter programming sequences are explained later in this section.

Data type delimiters are used to designate the occurrence of special types of data such as fields with various video attributes and non-ASCII character sets. The following is a list of the types of data and their delimiters:

Half Intensity Field:	FS	If protected mode is enabled
	ESC)	Start field
	ESC (	End field

Other Video Attribute Delimiters in the Native Mode:

Reverse Video	ESC G 4	Start field
Underline	ESC G 8	Start field
Blink	ESC G 2	Start field
Blank	ESC G 1	Start field
	ESC G 0	End all attribute fields

Other Video Attribute Delimiters in TVI-920 Mode:

Reverse Video	1/7	Start field
	1/3	End field
Underline	1/11	Start field
	1/3	End field
Blink	1/2	Start field
	1/0	End field

Blank	1/1	Start field
	1/0	End field
Special Graphics	ESC $	Start field
	ESC %	End field

6.9.4 Delimiter Programming and Selections

Both line and block boundary delimiter codes can be created by the user in setup mode B (see section 4.3.4 for the selections). When "Other" is selected in setup mode B, the user programmed delimiter codes are used for the boundary delimiters. The delimiter codes can be programmed by using the following sequences:

Line Delimiter Programming ESC x 1 <del1> <del2>
The codes specified by <del1> and <del2> will be used as the line delimiter. <del1> and <del2> are ASCII characters. When the programmed codes are selected as the line delimiter, these two codes are sent to the host at the end of each line transferred.

Transfer Delimiter Programming ESC x 4 <del1> <del2>
This programs the codes specified by <del1> and <del2> as transfer delimiters. <del1> and <del2> are ASCII characters. When these codes are the transfer delimeters, these two codes are sent to the host at the end of data transfer.

6.10 Printing Functions

Screen data is sent to the printer using the commands described in this section. There are two ways data can be sent to a printer: screen printing and auto printing mode. With screen printing, data on the screen (or page) is sent to the printer when a print command is received. Or, data from the host is sent to the printer directly with or without being displayed on the screen in auto printing.

The extent of the page printing varies depending on the print boundary mode and the command used. The print boundry is selected in the setup mode. (Refer to section 4.3.3.) When the page is selected as the print boundary, data from the entire page is printed. If the display is selected as the boundary, only data displayed on the screen is printed.

During screen printing, a CR code followed by an LF code is sent to the printer at the end of each line printed. These are fixed codes and cannot be changed by the user. At the end of screen printing, an ACK code may be sent to the host to notify the host that the printing has been completed, or the ACK code can be disabled in the setup mode. (Refer to section 4.3.3.)

6.10.1 Printing Screen Data

Print Unprotected ESC L

All unprotected data from the beginning of the page, (or screen), to the current cursor position is sent to the device attached to the printer port (J3). All protected data is printed as spaces. If the protect mode is not enabled, all data will be printed.

Print All ESC P

All data, from the beginning of the page, (or screen), to the current cursor position is sent to the printer regardless of its protection status.

6.10.2 Auto Printing

Transparent Print Mode On ESC `
Off ESC a

Using the transparent print mode, the computer may send data directly to the printer without effecting the terminal screen. If the transparent print mode is enabled, all data from the host is sent to the printer without being displayed on the screen. Only the transparent print off code will be recognized by the printer.

Transparent Print With Display On ESC @
Off ESC A

All data from the host is sent to the printer and displayed on the terminal screen. The off sequence also turns off other auto print modes.

Bidirectional Print On CTRL/R
Off CTRL/T

In the bidirectional mode, data from the host is treated as in the transparent print mode with the display on. In addition, the terminal can receive data from the printer and pass it to the host as it is received. Using this mode, bidirectional communication between the printer device and the host can be established.

6.11 Keyboard Controls

This section describes all keyboard control commands.

Lock Keyboard ESC #
Unlock Keyboard ESC "

When the keyboard is locked, data cannot be entered from the keyboard. When locked, the unlock command can be issued only from the host. If the keyboard is locked accidentally, the user can unlock the keyboard by pressing the CTRL/Home key.

Keyclick On	ESC >
Keyclick Off	ESC <

If keyclick is enabled, the keyboard generates an electronic keyclick sound whenever a key is pressed.

Auto Key Repeat Enable/Disable

The auto key repeat can be enabled or disabled only in the setup mode. (See section 4.3.2.) When auto repeat is enabled, a key stroke will be automatically repeated when a key is held down for more than half a second. The repeat rate is 15 characters per second.

Upper Case Lock

Alphabet keys can be locked to generate only upper case characters by selecting the upper case lock mode in the setup line. When the upper case lock mode is activated, the caps lock key will not have any effect until the upper case only mode is turned off in the setup line.

CHAPTER 7 DEC VT-100 MODE OPERATIONS

This chapter describes all applicable operations commands when the terminal is in the VT-100 emulation mode. In VT-100 mode, the KT-7S terminal supports all DEC VT-100 command sequences and ANSI X- 3.64 terminal control functions. In addition, the KT-7S terminal supports many enhanced functions for advanced operations.

7.1 Definitions and Conventions

This section describes the definitions and conventions used in character and command sequence encoding used in the TV-100 mode. The following definitions and conventions apply throughout this chapter:

Numeric Parameter, Pn:
A string of bit combinations that represent a number. ASCII codes 3/0 through 3/9 are used to represent a numeric parameter. These are ASCII characters "0" through "9".

Selective Parameter, Ps:
A string of bit combinations that select a subfunction from a specified list of subfunctions. ASCII codes 3/0 through 3/15 are used to represent a selective parameter.

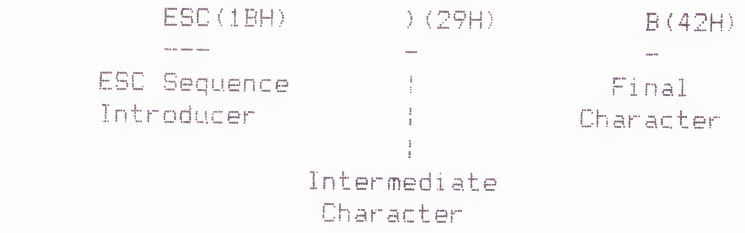
Default Parameter Value:
A function dependent value that is assumed when no explicit value, or a value of 0 is specified. For a function that requires numeric parameters, the default parameter value is 1. For a function that requires selective parameters, the default value is 0.

Final Character:
A character whose bit combination terminates an escape or control sequence. Final characters are ASCII characters from 4/0 to 7/14.

Escape And Control Sequence Encoding

Escape sequences are control strings that are preceded by an ESC character. They take the "form of ESC I ... I F" where I's are intermediate characters and F is the final character. Intermediate characters are optional.

For example, Esc sequence for selecting U.S. ASCII to G0 set is:

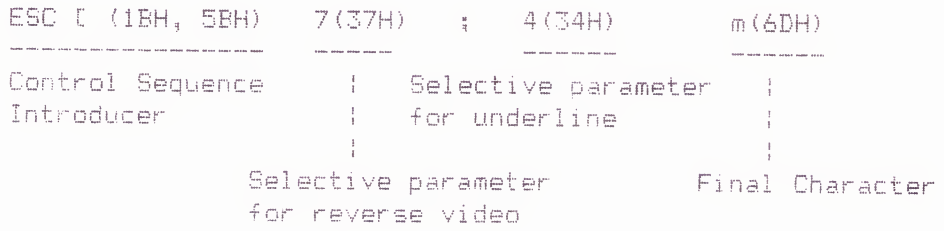


A control sequence is a control string that is preceded by a Control Sequence Introducer. It takes the form of:

ESC [<Parameter list> F

Where <Parameter list> is list of selection or numeric parameters and F is the final character, the parameters are optional. If no parameter is included, the default parameter value is assumed. If more than one parameter is included in the list, each parameter has to be separated by semicolons (ASCII value of 3/11).

EXAMPLE:
Control sequence to turn the underline and reverse video attribute is:



7.2 Control Characters

Control characters are ASCII codes with values from 0/0 to 0/14. The KT-7S terminal in the VT-100 mode recognizes all the control characters recognized by the DEC VT-100 terminal (listed in Table 7-1). All other control characters are ignored by the KT-7S terminal.

Table 7-1. Control Characters In VT-100 Mode

Control Character	Hex Value	Functions
NULL	0/0	Ignored by the terminal. (Not stored in the input buffer).
ENQ	0/5	Terminal transmits the answerback messages.
BEL	0/7	Rings the bell from the keyboard.
BS	0/8	Back Space. Moves the cursor one position to the left. Has same effect as CUB command.
LF	0/10	Linefeed. Moves the cursor down one line. Has same effect as the IND command.
VT	0/11	Same as LF
FF	0/12	Same as LF

CR	0/13	Moves the cursor to the left margin of the current line.
SO	0/14	Invokes G1 character set. See section 7.4.4 for G1 set.
SI	0/15	Invokes G0 character set.
DC1	1/1	X-On code. Causes the terminal to resume transmission to the originating device.
DC3	1/3	X-Off code. Stops the data transmission to the originating device.
CAN	1/8	If sent during a control sequence, the sequence is aborted.
SUB	1/10	Same as CAN.
ESC	1/11	Escape sequence introducer. All control sequences are preceded by this character.
DEL	7/15	Ignored by the terminal.

7.3 Cursor Control Commands

The current active position on the screen is indicated by the cursor. This section describes the commands available to move the cursor around the display page.

7.3.1 Cursor Movements and Positioning

CUU Cursor Up ESC [Pn A

Moves the cursor up by the number of lines specified by Pn, doen not effect the column position. When the cursor reaches the top row, it will stop.

CUD Cursor Down ESC [Pn B

Moves the cursor down by the number of lines specified by Pn without effecting the column position. The cursor stops when it reaches the bottom row.

CUF Cursor Forward ESC [Pn C

Moves the cursor right by the number of column positions specified by Pn. The row position is not effected by this command. When the cursor reaches the correct row of the current cursor line, it stops.

CUB Cursor Backward ESC [Pn D

Moves the cursor left by the number of column positions specified by Pn. The row positions are not effected. The cursor stops when it reaches the left margin of the current line.

CUP Cursor Positioning Within Page ESC [Pr ; Pc H

The CUP command moves the cursor to a specified position within the current page. The first parameter, Pr, specifies the row position and the second parameter, Pc, specifies the column position. If the values specified are greater than the respective margins, the cursor will move to the margins. If the specified row number does not appear on the display screen, the screen will scroll to the new cursor position. The cursor stays visible on the display screen at all times.

Example:ESC [10 ; 20 H
Will move the cursor to row 10 column 20.

KIMCUP Cursor Positioning Across Page ESC [Pp ; Pr ; Pc s

The KIMCUP command has three parameters associated with it. The first parameter, Pp, specifies the page number. The last two parameters specify the row and column positions.

If the specified page number is not the current page, the display screen will change to display the new page. The previous cursor position will be maintained. If the specified page number is greater than the maximum number of pages available, the screen will display the last page.

The row and column numbers are defined in same way as in CUP.

Example:ESC [2;10;20 s
Will move the cursor to row 10 column 20 of page 3.

HVP Horizontal Vertical Position ESC [Pr ; P c f

Same as CUP command.

NEL Next Line ESC E

Moves the cursor to the left margin of the next line. When the cursor is at the bottom of the page, the page scrolls up one line. If auto page mode is enabled, the cursor will move to the first line of next page. See Section 7.5 for auto page mode control.

IND Index ESC D

Same as line feed.

KIMNEL Next Line ESC [Pn E

This command moves the cursor to the first column position a defined number of lines down.

KIMPL Previous line ESC [Pn F

This command is reverse of KIMNEL command and moves the cursor to the first column position a defined number of lines up.

RI Reverse Index ESC M

Moves the cursor one line up on the same column. If the cursor is at the top of the page, the page will scroll down one line and a new blank line will be created at the top of the page. If the auto page mode is enabled, the cursor will move to the last line of previous page.

DECSC Save Cursor ESC 7

This command saves the current cursor location and the data attribute mode.

DECRC Restore Cursor ESC 8

Restores all the cursor parameters saved by the previous DECSC command.

7.3.2 Modes Pertaining to Cursor Movement

NLM	NewLine Mode		ESC [20 h
	LineFeed Mode		ESC [20 l

When the NewLine mode is enabled, the Return key on the keyboard generates an LF code followed by a CR code. Also, an LF code received will perform an LF function followed by a CR function. When the LineFeed mode is enabled, the Return key generates only a CR code and an LF code will perform an LF function only.

DECAWM	Autowrap Mode	On	ESC [? 7 h
		Off	ESC [? 7 l

When the cursor reaches the last column of a line, the autowrap mode moves the cursor to the first column of the next line. If Autowrap mode is disabled, the cursor will stay in the last column until a cursor control command is received.

7.4 Display Controls

This section explains VT-100 operations commands that control the display characteristics of KT-7 , such as screen controls, video attributes, and character set selection.

7.4.1 Screen Attributes

Bright Background	On	ESC [? 5 h
	Off	ESC [? 5 l

When the bright screen background is on, dark characters are displayed dark against a bright background. When the bright background is disabled, the characters are displayed bright on the normal dark background.

Screen Off ESC [?7 ; 0 z
On ESC [?7 ; 1 z

When the screen is off, the display goes blank. The screen should be left on for normal operations.

Set Screen Intensity ESC [4 ; Ps z

Set screen intensity to the level specified by Ps. Ps ranges from 0 to 7, 0 being the lowest intensity.

Set Screen Saver Time Limit ESC [2 ; Ps z

This command sets the time limit before the screen saver is activated. When the screen remains inactive, (no data received from the host or keyboard), for the the period specified by Ps, the screen saver is activated and the screen is turned off until data is received. Ps selects the time period as follows:

Ps = 0 Disable Screen saver
Ps = 1 4 minutes
Ps = 2 8 minutes
Ps = 3 12 minutes

7.4.2 Cursor Attibutes

Cursor Attributes ESC [3 ;Ps z

This command defines the cursor shape. Ps ranges from 0 to 4 and displays the cursor attribute as follows:

Ps = 0 Invisible Cursor
Ps = 1 Blinking Block
Ps = 2 Steady Block
Ps = 3 Blinking Underline
Ps = 4 Steady Underline

7.4.3 Video Attributes

FIMNAM Define Normal Attribute ESC [7 ; Ps z

The normal attribute state, (all attributes off), can be attained by using this command. Either high intensity or low intensity with all other attributes off should be selected. Select low intensity as the normal intensity for VT100 compatibility. After execution of this command, all attributes are turned off to the normal attribute state.

Ps = 0 Select low intensity as normal intensity
Ps = 1 Select high intensity as normal intensity

SGR Selective Graphics Rendition ESC [Ps m

This command controls the visual attributes associated with each graphics character entered. The KT-7S terminal includes the character attributes listed below. The attributes may be combined to achieve different visual effects. The available video attributes and their parameter values are listed as follows:

Ps = 0 Turns all attributes off to the normal attribute state.

Ps = 1 Turns bold intensity on, if normal attribute is selected to be low. If normal intensity is high, this command is ignored.

Ps = 2 Turns half intensity on if the normal attribute is selected to be high. Ignored if the normal intensity is low.

Ps = 3 Blank

Ps = 4 Underline

Ps = 5 Blink

Ps = 7 Reverse Video

If the normal attribute selected is high brightness, the bold intensity attribute is not available. The command for the bold intensity sets the character intensity to normal brightness. If the normal attribute selected is low intensity, the command for low intensity attribute sets the character intensity to normal brightness.

After a SGR command is received by the terminal, all graphics characters entered will be displayed with that attribute until a new SGR command is received. Upon terminal power on or reset, the attribute will default to all attributes off.

7.4.4 Character Set Selections

The KT-7S character repertoire includes five different sets. They are:

* Default ASCII Character Set
* U.K. National Character Set
* Special Graphic Character Sets
* Mosaic Set
* Multinational Character Set

The active character set is selected in two steps:

i. Assign two character sets from the repertoire to be the primary and secondary working character sets G0 and G1 respectively.

ii. Enable one of the two working character sets as the primary working character set. (Refer to Figure 7-1.)

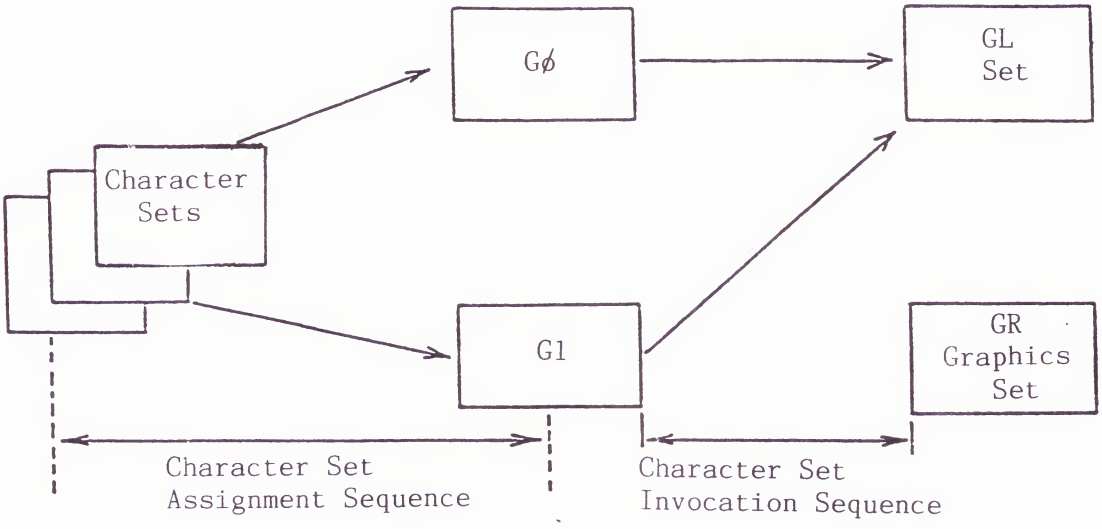


Figure 7-1. Character Set Selection and Assignment

When an ASCII set is selected, the keyboard is automatically converted to the appropriate layout for the language mode selected. (Refer to section 4.3.2 for the language mode selection.) In this mode, the received codes are interpreted and displayed as standard ASCII characters.

When the special graphics set is selected, all received characters are displayed as special graphics symbols instead of standard ASCII character symbols. (See Appendix D for the special graphics character sets.) The keyboard assumes the default U.S. layout in this mode. See Appendix H for international keyboard layouts.

When the Mosaic set is selected, all received codes are displayed as mosaic cells, shown in Appendix E. The mosaic set conforms with the CCITT S.100 standard mosaic sets. The mosaic set codes are from 2/0 through 3/15 and 5/15 through 7/15. The codes from 0/0 through 1/15 are not defined. 4/0 to 5/14 are used for VT-100 graphics characters.

The multinational character set includes non-English European characters. See Appendix F for multinational characters and their codes.

You can assign the character sets to G0 and G1 using the commands listed in Table 7-1. These commands are fully VT-100 compatible.

Table 7.1 Character Set Selection Commands

Character Set	Working Set	Command
U.S. ASCII	G0	ESC (B
	G1	ESC) B
U.K. National	G0	ESC (A
	G1	ESC) A
Special Graphics	G0	ESC (0
	G1	ESC) 0
Multinational Character Set	G0	ESC (1
	G1	ESC) 1
Mosaic Set	G0	ESC (2
	G1	ESC) 2

The active character set is selected using the following commands:

Command	Code Value	Selects
SI	0/15	Primary Set
SO	0/14	Secondary Set

7.4.5 Relative Origin Mode

DECSTB Set Top/Bottom Margin ESC [Pt ; Pb r

This command defines the relative window margin to be used with the relative origin mode. The top margin is set by Pt and the bottom is set by Pb. If Pt is the same or greater than Pb, then the margin is set to the top and bottom of the page.

ROM Relative Origin Mode ESC [? 6 h
AOM Absolute Origin Mode ESC [? 6 l

In the relative origin mode, the top and bottom margins of the page are set to the values defined by DECSTB. The cursor stays within the margin. Absolute origin mode selects Home position to be the upper-left corner of the screen. Cursor can be moved out of the margin by the cursor addressing.

7.4.6 Defining the 25th Line

KIM25L Define 25th Line Mode ESC [0 ; Ps z

The 25th line of the KT-7 may be used as the terminal status line or user message line. If no 25th line is desired, it can be disabled. KIM25L defines the usage of the 25th line.

Ps = 0	No 25th line
Ps = 1	Status line on
Ps = 2	User message line

7.5 Page Controls

The KT-7 terminal may consist of up to four display pages, depending on the physical display memories installed. (The installed memory size is displayed in status line field 9). The page size and number of pages can be configured using the KIMLP command.

Using the page flip command, the cursor can be moved across the current page boundary to the next. Whenever a page is flipped with these commands, the cursor position from the previous page is maintained.

KIMLP Page Length Setup CSI 1 ; Ps z

This command establishes the length of a logical page.

Ps = 0	24 lines per page
Ps = 1	48 lines per page
Ps = 2	96 Lines per page

If the page length specified is longer than the total number of lines available, then the maximum number of lines available will be set as the page size. The total number of pages available is also determined by this command. See Table 6-3 for the relationship between the number of lines per page and the total number of pages.

NP Next Page CSI Pn U

This command moves the cursor forward by the number of pages specified by Pn. If the specified number of pages is larger than the number of pages available, the cursor will move to the last available page.

PP Previous Page CSI Pn V

This command moves the cursor the specified number of pages backward. If the number of pages specified is larger than the current page number, the cursor will move to the first page.

KIMAPM Auto Page Mode On CSI ? 2 0 h
Off CSI ? 2 0 l

If the auto page mode is enabled, the cursor moves to the next or previous page when it reaches the bottom or top of the current page. If disabled, the cursor will stay within the current page when it reaches the top or bottom margins.

7.6 Screen Editing

This section describes all commands pertaining to screen/page data editing. Editing commands include delete and insert character, delete and insert line, and erase functions. Terminal modes pertaining to editing are described in this section. All editing commands are cursor inclusive. That is, the character in the cursor position is also effected by editing commands.

7.6.1 Text Insert/Delete

ICH Insert Character ESC [Pn @

This command shifts data on the current cursor line to the right and makes the specified number of blank spaces starting from the cursor position. The data on the right margin will be lost.

DCH Delete Character ESC [Pn P

When received, this command deletes a specified number of characters starting from the cursor position. The data on the current line from the cursor to the end of the line is shifted to the left and blank spaces are created on the right margin.

DL Delete Line ESC [Pn M

This command deletes Pn number of lines from the current cursor line. All data below the cursor line is moved up and blank lines are created at the bottom of the page.

IL Insert Line ESC [Pn L

Inserts Pn number of lines at the current cursor line. All data from the current line to the end of page is moved down and blank lines are created at and below the current line. The data at the bottom margin is lost.

7.6.2 Erase Functions

ED Erase in Display ESC [Ps J

Use this command to erase data within the display or page. The effect of this command is determined by Ps as follows:

Ps = 0 Erase data from the cursor position to the end of page/display.

Ps = 1 Erase data from the home position to the cursor position.

Ps = 2 Erase data from the home position to the end of the page.

EL Erase in Line ESC [Ps K

This command erases the data on the current line. Line attributes are not affected by this command.

Ps = 0 Erase the data on the current cursor line from the cursor to the end of the line.

Ps = 1 Erase the data on the current cursor line from the first column to the cursor position.

Ps = 2 Erase current line data from the first column to the end of the line.

7.6.3 Insert Mode

IRM Insert Mode ESC [4 h
Replace Mode ESC [4 l

When the insert mode is on, all data from the cursor to the end of the line is moved one position to the right as a character is entered at the cursor position. In replace mode, the character entered replaces the character formerly in the cursor position.

7.7 Tab and Margin Bell

The KT-7S terminal provides a tab and margin bell to aid screen editing. Using the commands described in this section, you can set the tab and margin bell in any location.

HTS Horizontal Tab Set ESC H

This command sets a tab at the current cursor position. Other tab positions are not effected.

TBC Tab Clear ESC [ps g

Clears the tab positions set by the HTS command.

Ps = 0 Clear tab at the current position
Ps = 3 Clear all tabs

CHT Cursor Horizontal Tab ESC [Pn I

This command moves the cursor Pn tab positions forward. When the cursor reaches the right margin, it stops.

CBT ESC [Pn Z

Cursor Back Tab. This command moves the cursor Pn tab positions backward. When the cursor reaches the left margin, it stops.

KIMSMB ESC o

Sets the margin bell at the current cursor column position. The previous margin bell position is canceled.

KIMCMB ESC n

Clears the margin bell.

7.8 Function Keys

In VT-100 mode, a total of 22 programmable function keys are available: F1 to F10, shifted F1 to shifted F10, Alt, and Cmd keys. See Section 10.1 for function key programming.

KIMXPF Execute Function Keys ESC Ps !

When this command is received by the terminal, the data of the specified function key is processed. Ps denotes the function key to be executed and listed as follows.

Function Key	Ps
Normal F1 .. F10	1 .. 10
Shifted F1 .. F10	11 .. 20
Alt	21
Cmd	22

KIMCLRF Clear Function Key Buffer ESC !

This command clears the function key buffer. Use this command when there is difficulty programming function keys because of buffer space available.

7.9 Data Communications with the Host

This section decribes host communications modes and their controls.

KIMLOM Local/Online Mode

This mode cannot be enabled by a remote command. Use the Local key on the keyboard to enable or disable this mode. (See Section 5.1.3 for details on the use of the Local key.) In local mode, the terminal is disconnected from the host. No data transaction is allowed between the terminal and the host. When in the online mode, normal data transaction between the terminal and the host is allowed.

SRM	Local Echo On	ESC [12 h
	Local Echo Off	ESC [12 l

Send-Receive Mode. In the set state, data from the keyboard is locally echoed to the screen. This mode is primarily used for half duplex applications when the host does not echo characters sent by the terminal.

KIMBM	Block Mode	ESC [? 10 h
	Conversation Mode	ESC [? 10 l

If the block mode is enabled, all data input from the keyboard will not be sent to the main port. Instead it will be directed to the screen only. The data on the display page is transmitted to the host only when the transfer command DECXMT is received. In conversation mode, all data entered from the keyboard will be sent to the host. Data will also be sent to the screen if the local echo mode is enabled.

DECXMT	Transfer	ESC 5

This command initiates data transfer from the terminal to the host. When the transfer boundary of an entire page is selected, the whole page will be transferred. Otherwise, only the display screen data will be transferred.

7.10 Print Commands

The auxiliary port is typically used as a printer port. The printer port and print functions are controlled with the commands described in this section.

7.10.1 Printing the Screen Data

The screen print command sends the text data on the terminal screen to the printer. The boundary of the data block sent to the printer is determined in setup mode B (see section 4.3.3). If "Page" is selected to be the boundary, then the block of data from the top of the page to the cursor is printed. If "Display" is the chosen boundary, then only the data from the top of the current screen to the cursor position is printed.

KIMPA	Print Page All	ESC [? 0 i

This command prints the screen data from the top of the page, (or display), to the cursor. CR and LF codes are inserted at the end of each line printed.

KIMPF	Print Page Format	ESC [0 i

Prints all full intensity data from the top of the page, (or display), to the cursor. All half intensity characters are printed as spaces. If the protect mode is disabled, this command has the same effect as KIMPA.

7.10.2 Auto Printing

In addition to the screen print function, the data from the host may be sent to the printer directly with or without being displayed on the terminal screen. This is termed Auto Printing.

KIMPRT	Transparent Print	On	ESC [5 i
		Off	ESC [4 i

When the transparent print mode is enabled, all data received from the host is sent to the printer directly, without being displayed on the terminal screen. In this mode, no control characters or sequences except the transparent print off sequence are recognized by the terminal.

KIMPND	Print and Display	On	ESC [? 7 i
		Off	ESC [? 6 i

When this mode is enabled, all data received from the host is sent to the host and displayed on the terminal screen at the same time.

KIMBID	Bidirectional Print	On	ESC [? 5 i
		Off	ESC [? 4 i

When bidirectional print is enabled, all data received from the host is processed the same as in the KIMPND mode. In addition, the terminal can receive data from the printer and send it directly to the host without local processing.

7.11 Keyboard Controls

<AM	Keyboard Action Mode	Lock	ESC [2 h
		Unlock	ESC [2 l

When the keyboard is locked, no data is allowed from the keyboard. It can be unlocked by the Unlock command from the host or by typing CTRL/Home from the keyboard.

KIMKCK	Keyclick Mode	On	ESC [6 ; 1 z
		Off	ESC [6 ; 0 z

When the keyclick is enabled, the keyboard will generate an electronic keyclick whenever a key is pressed.

NKPM	Numeric Keypad Mode	On	ESC =
		Off	ESC >

This command affects the codes generated by the keys on auxiliary keypad. When this mode is on, application mode is entered. The generated codes for numeric and application keypad mode are listed in Table 5-7.

CKPM	Cursor Keypad Mode	On	ESC [? 1 h
		Off	ESC [? 1 l

This command affects the code generated from the cursor keys. If the cursor keypad mode is on, application mode is enabled. Refer to Table 5-6 for the code generated in each mode.

7.12 System Control and Tests

RIS Reset to Initial State ESC c

This command causes the terminal to be reset to power-up state.

DECALN Screen Alignment Test ESC # 8

This command fills the screen with H's. It can be used to adjust screen alignment.

DSR Device Status Report ESC [6 n

The host requests a cursor position report from the terminal.

CPR Cursor Position Report ESC [Pr ; Pc R

This sequence is sent to the host upon receiving the command DSR. Pr indicates the row position and Pc denotes the column position.

CHAPTER 8 DEC VT-52 MODE OPERATIONS

In the VT-52 emulation mode, the KT-7S terminal recognizes all valid VT-52 command sequences. The KT-7S also supports enhanced command sequences to control systems functions that are not supported by VT-52 terminals. In addition to this chapter, the command sequences described in chapter 10 are also supported.

8.1 Basic VT-52 Commands

Cursor Up ESC A

This command moves the cursor up one line. If the cursor is at the top of the page, this command is ignored. Cursor column position is not effected by this command.

Cursor Down ESC B

This command moves the cursor down one line. If the cursor is at the bottom of the page, this command has no effect. The column position of the cursor is not changed by this command.

Cursor Right ESC C

This command moves the cursor ahead one column position. This command is ignored when the cursor reaches the right page margin. The line position of the cursor is not affected by this command.

Cursor Left ESC D

This command moves the cursor position back one column. If the cursor is at the left page margin, this command is ignored.

Cursor Home ESC H

This command moves the cursor to the home position of the display.

Graphics Mode Enable ESC F

This command invokes the graphics character set as the active character set. After this command is executed, all data entered will be displayed as special characters.

Graphics Mode Disable ESC G

This command invokes the standard ASCII character set as the working character set. All subsequently entered data will be displayed as normal ASCII characters.

Reverse Linefeed ESC I

Moves the cursor up one line. If the cursor is in the top row of

the page, this command causes the page data to scroll down one line creating a blank line at the top of the page. The data on the bottom line of the page will be lost.

Erase to End of Page ESC J

Erases page data from the cursor position to the end of the page. The erased space is filled with the current fill character. The fill character can be selected in the terminal setup mode.

Erase to End of Line ESC K

Erases the data on the current cursor line from the cursor position to the end of the line. The erased space will be filled with the current fill character.

Direct Cursor Addressing ESC Y <line> <col>

This command moves the cursor to the position within the page specified by the given line# and col#. The line and column numbers specified are ASCII codes less 20H. If the given code value is too large or too small, the cursor will move to the respective margin.

Example: ESC Y ! 8

Will move the cursor to the second row 25th column.

Identify ESC Z

When the terminal receives this command, it sends its identification code sequence to the host. The identification sequence is ESC / Z .

Enter Alternate Keypad Mode ESC =

This command enables the alternate keypad mode. In the alternate keypad mode, the auxiliary numeric keypad generates application code sequences. See Table 5-7 for the generated code sequences.

Enter Numeric Keypad Mode ESC >

This command terminates the alternate keypad mode and enables the numeric keypad mode. In the numeric keypad mode, the auxiliary keypad will generate normal numeric codes.

Enter ANSI Mode ESC <

This command terminates the VT-52 emulation mode and enables the VT-100 emulation. All subsequently received VT-52 commands will not be recognized by the terminal. Instead, only VT-100 commands will be recognized.

Back Tab ESC T

Moves the cursor to the previous tab stop. If there are no more tab stops, the cursor is moved to the left margin.

8.2 Enhanced Commands

The following commands are included in VT-52 mode. Refer to Chapter 6 for the detailed meanings and operations of each command.

Enable Half Duplex Mode	ESC {
Enable Full Duplex Mode	ESC }
Display Status line	ESC h
Display User line	ESC g
Disable 25th line	ESC e
Set Margin Bell	ESC o
Clear Margin Bell	ESC n
Print All	ESC P
Auto Page On	ESC v
Auto Page Off	ESC w

CHAPTER 9 DG-100/200 Mode Operations

This chapter explains the command sequences recognized by the KT-7S terminal in the DG mode. In the D100/200 mode, the following sets of commands are supported by the KT-7 terminal:

i. All DG-100/200 commands
ii. All CSI commands (ESC [commands) described in the Chapter 7
iii. Global systems commands described in Chapter 10.

9.1 Screen Control Commands

Roll Enable CTRL/R
When the roll mode is enabled, the screen data scrolls up or down when the cursor reaches the bottom or top margin.

Roll Disable CTRL/S
When the roll mode is disabled, the screen data does not scroll. Instead, the cursor wraps to the top of the page when it reaches the bottom margin.

Erase End of Line CTRL/K
Clears the data on the current line with blank spaces from the cursor to the end of that line.

Erase Page CTRL/L
Clears the entire page with blank spaces. After this command is executed, the cursor returns to the home position, all attributes are turned off, and blink is enabled.

Enable Blink CTRL/C
Allows all screen data with the blink attribute to blink. Blink is enabled when the terminal is powered on or the erase page command is executed.

Disable Blink CTRL/D
Disables character blinking. All characters with the blink attribute are displayed steady. The attribute itself is not affected by this command.

9.2 Cursor Positioning

Carriage Return CTRL/M
Moves the cursor to the left margin of the current line.

New Line CTRL/J
Moves the cursor to the left margin of the next line.

Cursor Up CTRL/W
Moves the cursor up one line while remaining in the same column. If the cursor is in the top row of the page, it moves to the bottom row of the page.

Cursor Down CTRL/Z

Moves the cursor down one line while maintaining at the same column position. If the cursor is at the bottom of the page and the roll mode is enabled, the page data scrolls up one line and a new blank line is created at the bottom margin. The data on the top row is lost.

Cursor Forward CTRL/X

Moves the cursor one position to the right. If the cursor is at the right margin, it moves to the left margin of the next line.

Cursor Backward CTRL/Y

Moves the cursor one position to the left. If the cursor is at the left margin, it goes to the right margin of the previous line.

Cursor Home CTRL/H

Moves the cursor to the home position. The home position is defined as the first line and first column of the page.

Write Cursor Address CTRL/P , <col>, <row>

Moves the cursor to the position defined by the value of <col> and <row> codes. <col> is an ASCII character ranging from 00H to 79 and specifies the column position. When its value exceeds 79, its module 80 value is used as the column number. For example, if an ASCII code with value 80 is specified, the column number is 0. <row> should be an ASCII character ranging from 00 to 23 and specifies the row position. When its value exceeds 23, its module 24 value is used as the row value.

Read Cursor Address CTRL/E

The terminal reports the current cursor position to the host. The format of the report message is:

CTRL/_ <col> <row>

See Write Cursor Address command for the meanings of <col> and <row>.

9.3 Video Attributes

Start Blink CTRL/N

When the blink attribute is turned on, all characters subsequently entered are displayed with the blink attribute.

End Blink CTRL/O

Turns off the blinking attribute. Subsequently entered characters will not be displayed with the blink attribute.

Start Dim CTRL/\

Turns the dim attribute on. All data subsequently entered is displayed with half the intensity of normal characters.

End Dim CTRL/]

This command turns the dim attribute off. All data subsequently entered is displayed with full intensity.

Start Underline CTRL/T

With the underline attribute on, all data entered will be displayed with an underline.

End Underline CTRL/U

This command turns the underline attribute off.

Start Reverse Video CTRL/^, D

This command turns the reverse video attribute on. All data entered on the screen afterward is displayed dark within a bright character cell.

End Reverse Video CTRL/^, E

This command turns the reverse video attribute off.

9.4 Print Commands

Print CTRL/Q

This command causes the terminal to send page data to the printer port. Only data from the cursor to the end of page is printed. Printing can be aborted by typing ALT, Return from the keyboard.

Print Form CTRL/A

This command is the same as the Print command except that characters with dim attribute are not printed, but represented by spaces.

9.5 Other Commands

Bell CTRL/G

When this command is received, the terminal enables the margin warning bell on the keyboard.

CHAPTER 10 EMULATION INDEPENDENT OPERATIONS

This chapter describes terminal commands available in every emulation mode. All user function programming, macro graphics commands, and clock control commands are globally available in any of the KT-7S emulation modes.

10.1 User Function Key Programming

The user function keys are available in the Native mode, TVI mode, and DEC mode. The available number of function keys vary depending on the emulation mode. In Native and TVI-920 mode, there 42 function keys available. In DEC mode, only 22 function keys are available. In the DG mode, no user programmable function keys are available. All function keys generate fixed, two byte code sequences in DG mode. Refer to chapter 5 for available user function keys in each emulation mode.

Even when all 42 function keys are not available for use, the user is able to program any of the 42 function keys in any emulation modes. To program a function key, enter the following sequence:

ESC ! P1 P2 <data> CTRL/Y

Where P1 is the function key code.
P2 is the output destination code.
<data> represents the string of ASCII characters to be programmed.

The function key codes, P1, are designated as shown in table 10-1.

Table 10-1 The function key codes

Key Name	Level 1 Normal	Level 1 Shifted	Level 2 Normal	Level 2 Shifted
Xmit	'	"	A	a
F1	1	!	B	b
F2	2	@	C	c
F3	3	#	D	d
F4	4	$	E	e
F5	5	%	F	f
F6	6	^	G	g
F7	7	&	H	h
F8	8	*	I	i
F9	9	(	J	j
F10	0	)	K	k
Cursor Up	-	_	L	l
Cursor Down	=	+	M	m
Cursor Left	`	~	N	n
Cursor Right	[	{	O	o
Cursor Home	]	}	P	p

Edit-1	\	]	Q	q
Edit-2	,	<	R	r
Edit-3	.	>	S	s
Edit-4	/	?	T	t
Alt	:			
Cmd	;			

The output destination code, P2, selects where the contents of the function key is to be sent when the function key is pressed. The output destination is selected as follows:

P2 = 1 To the host
2 To the screen
3 To both the host and the screen

10.2 User Message Line Programming

The user message line can be programmed and displayed in the 25th line in any of the emulation modes. See the appropriate section for 25th line display in each emulation mode. To enter data for the user message line, enter the following sequence:

ESC f <data> CR

where <data> is ASCII string to be programmed. CR is carriage return code, 0DH.

This sequence destroys any previously programmed user message. If the user line is enabled, the data programmed is displayed on the 25th line as it is entered.

The CR code terminates user message programming. Up to 80 characters of data may be entered. If the entry exceeds 80 bytes, then only 80 characters are saved as user message and the sequence terminates.

10.3 Answerback Programming

The answerback message can be programmed in any of the emulation modes. The answerback is activated when appropriate answerback request command is received by the terminal. In the Native, TVI-920, and DEC mode, ENQ (05H) code initiates the answerback message transmission to the host. In DG mode, ESC E initiates the answerback transmission. To program the answerback message, enter the following sequence:

ESC] <data> CR

As soon as ESC] is entered, the 25th line becomes blank and the data is displayed as it is entered. Up to 16 bytes of data can be prgrammed as the answerback message. If the data exceeds 16 bytes, the character entered last is replaced by the previous character. The programming sequence is terminated only by a CR code.

10.4 Tabular Graphics Command

With tabular graphics commands, tabular objects such as blocks and lines can be drawn with a single command instead of multiple commands required in most terminals with special block graphics.

Draw Block ESC [Ps ; Pw ; Pd sp p

This command draws a block, which size is defined by Pd and Pw. Pw is the width of the block measured from the cursor, right. Pd is the depth of the block measured from the cursor, down. Pw and Pd are numeric parameters defined in section 7.1. "sp" is the space code (ASCII 2/0). The sequence is terminated by p (ASCII 7/0).

The type of the block is determined by Ps as follows:

Ps = 0	Solid Block filled with Underline
= 1	" " " " Reverse Video
= 2	" " " " Blink attribute
= 3	" " " " Blank attribute
= 4	Hollow block with thin line

Draw Line ESC [Ps ; Pl sp p

This command draws a horizontal or vertical line from the cursor position. Pl specifies the length of the line to be drawn. The length is measured from the cursor to the right, for horizontal lines and down for vertical lines. Pl is a numeric parameter as described in Section 7.1.

Ps selects the type and direction of line to be drawn as follows:

Ps = 6	Thin horizontal line
= 8	Thin vertical line

10.5 Triple Sized Characters

In the KT-7S terminal, characters three times the normal size can be shown on the screen with a single command. The triple sized character are composed of special mosaic characters and are not ASCII characters.

Write a Triple Sized Character ESC [Ps x

This command writes a single, triple sized character at the cursor position. The character occupies a block that is three character cells wide from the cursor to the right, and three normal

character cells high from the cursor, down. Ps denotes the decimal ASCII values. Only the following ASCII characters can be displayed in the triple size:

A..Z 0..9 . (period) - (hyphen)

If characters other than above are specified in this command, the command is ignored. After a triple character is written, the cursor moves three character positions forward.

10.6 Clock Controls

The clock is located on the far left edge of the status line. Using commands described in this section, the time can be loaded, changed, and sent to the host or the printer.

Load Clock ESC sp 1 <am/pm> h1 h0 m1 m0

This command loads the clock with the specified values. <am/pm> is ASCII charcter A or P designating am or pm. h1 and h0 are ASCII characters '0' through '9' designating the second and the first digit of hour to be loaded. m1 and m0 specifies the minute values to be loaded.

Send Time to the Host ESC sp 2

Upon receiving this command, the terminal sends the current time of the clock to the host. The sequence sent is:

<am/pm> h1 h0 m1 m0

The meaning of each byte sent is same as in load time command.

Print Time ESC V

This command sends the time to the printer. The format of the sequences sent is the same as in the Send Time To the Host command.

APPENDIX A

QUICK REFERENCE TO TERMINAL FUNCTIONS

A-1. Native and TVI-920

FUNCTION	NATIVE	920
Bell	CTRL/G	CTRL/G
Cursor Left	CTRL/H	CTRL/H
Cursor Right	CTRL/L	CTRL/L
Cursor Down	CTRL/V	CTRL/J
Cursor Up	CTRL/K	CTRL/K
Cursor Home	CTRL/^	CTRL/^
Carriage Return	CTRL/M	CTRL/M
Linefeed	CTRL/J	CTRL/J
New Line	CTRL/_	CTRL/_
Tab	CTRL/I	CTRL/I
Reverse Linefeed	ESC j	
Address Cursor Page Row Column	ESC - P,R,C,	ESC - P,R,C
Address Cursor Row Column	ESC = R,C	ESC = R,C
Read Cursor Page Row Column	ESC /	ESC /
Read Cursor Row Column	ESC ?	ESC ?
Back Tab	ESC I	ESC I
Set Column Tab	ESC 1	ESC 1
Clear Column Tab	ESC 2	ESC 2
Clear All Tab	ESC 3	ESC 3
Field Tab	ESC i	ESC i
Clear All to Nulls	ESC *	ESC *
Clear Unprotected to Spaces	ESC + or ESC ; or CTRL/Z	ESC ; or CTRL/Z
Clear All to Half Intensity	ESC ,	
Clear Unprotrcted to Nulls	ESC :	ESC :
Clear All to Spaces		ESC +
Character Insert	ESC Q	ESC Q
Character Delete	ESC W	ESC W
Line Insert	ESC E	ESC E
Line Delete	ESC R	ESC R
Keyclick on	ESC >	ESC >
Keyclick off	ESC <	ESC <
End of Reverse Video	ESC G 0	ESC k
Start Reverse Video	ESC G 4	ESC j
Start Blink Field	ESC G 2	ESC ^
Start Blank Field	ESC G 1	ESC _

End Blink/Blank	ESC G 0	ESC q
Start Underline	ESC G 8	ESC l
End Underline	ESC G 0	ESC m
Erase EOF with Spaces	ESC T	ESC T
Erase EOF with Nulls	ESC t	ESC t
Erase EOP with Spaces	ESC Y	ESC Y
Erase EOP with Nulls	ESC y	ESC y
Lock Keyboard	ESC #	ESC #
Unlock Keyboard	ESC "	ESC "
Protect Mode on	ESC &	ESC &
Protect Mode off	ESC '	ESC '
Half Intensity on	ESC)	ESC)
Half Intensity off	ESC (	ESC (
Block Mode on	ESC B	ESC B
Conversational Mode on	ESC C	ESC C
Blank Screen	ESC O	
Normal Screen	ESC N	
Send Line Unprotected only	ESC 4	ESC 4
Send Page Unprotected only	ESC 5	ESC 5
Send Line all	ESC 6	ESC 6
Send Page all	ESC 7	ESC 7
Send Message Unprotected only	ESC S	ESC S
Send Message all	ESC s	ESC s
Print Unprotected only	ESC L	ESC L
Print all	ESC P	ESC P
Display Status Line	ESC h	ESC h
Display User Line	ESC g	ESC g
Disable 25th Line	ESC e	ESC e
Monitor Mode on	ESC U	ESC U
Monitor Mode off	ESC u or	ESC u or
	ESC X	ESC X
Insert Mode on	ESC Z	ESC Z
Insert Mode off	ESC r	ESC r
Set Margin Bell	ESC o	ESC o
Clear Margin Bell	ESC n	ESC n
Reverse Video	ESC b	ESC b
Normal Video	ESC d	ESC d
Auto Paging on	ESC v	ESC v
Auto Paging off	ESC w	ESC w

Local Edit Mode on	ESC k	
Duplex Edit Mode on	ESC l	
Full Duplex on	ESC }	ESC }
Half Duplex on	ESC {	ESC {
Auto wrap on	ESC ~	ESC ~
Auto wrap off	ESC O	ESC O
Auto Linefeed on	ESC 8	ESC 8
Auto Linefeed off	ESC 9	ESC 9
Define Page Size	ESC \ n	ESC \ n
	where n = 1 24 Line/Page	
	n = 2 48 Line/Page	
	n = 3 96 Line/Page	
Next Page	ESC K	ESC K
Previous Page	ESC J	ESC J
G0 Character Set Selection	ESC CTRL/X n	ESC CTRL/X n
G1 Character Set Selection	ESC CTRL/Y n	ESC CTRL/Y n
	where n = 0 Graphic Set	
	n = 1 Multinational Set	
	n = 2 Mosaic Set	
	n = A U. K.	
	n = B U. S. ASCII	
Select G0 Set	ESC CTRL/Z 0	ESC CTRL/Z 0
Select G1 Set	ESC CTRL/Z 1	ESC CTRL/Z 1
Transparent Print on	ESC `	
Transparent Print off	ESC a	
Transparent Print w/display on	ESC @	ESC @
Transparent Print w/display off	ESC A	ESC A
Bidirectional Print on	CTRL/R	
Bidirectional Print off	CTRL/T	
Enable X-on/X-off	CTRL/Q	
Disable X-on/X-off	CTRL/N	
Define Cursor Type	ESC . n	ESC . n
	where n = 0 no cursor	
	n = 1 blinking block	
	n = 2 steady block	
	n = 3 blinking underscore	
	n = 4 steady underscore	
Select Transmit Termination Character	ESC x 4 NN	ESC x 4 NN
Select Line Termination Character	ESC x 1 NN	ESC x 1 NN

A-2. VT-100

Function	Command
Insert character	ESC [Pn @
Insert line	ESC [Pn L
Delete character	ESC [Pn P
Delete line	ESC [Pn M
Erase within display	ESC [Ps J
Ps = 0 from cursor to end of page	
Ps = 1 from home to cursor	
Ps = 2 from home to end of page	
Erase within line	ESC [Ps K
Ps = 0 from cursor to end of line	
Ps = 1 from first col to cursor	
Ps = 2 from first col to end of line	
Execute function key	ESC [Ps !
Transparent print on	ESC [5 i
Transparent print off	ESC [4 i
Print and display on	ESC [? 7 i
Print and display off	ESC [? 6 i
Bidirectional print on	ESC [? 5 i
Bidirectional print off	ESC [? 4 i
Define 25th line	ESC [0 ; Ps z
Ps = 0 disable 25 th line	
Ps = 1 display status line	
Ps = 2 display uset line	
Define page size	ESC [1 ; Ps z
Ps = 0 24 line/page	
Ps = 1 48 line/page	
Ps = 2 96 line/page	
Define screen saver time	ESC [2 ; Ps z
Ps = 0 no time limit	
Ps = 1 4 minutes	
Ps = 2 8 minutes	
Ps = 3 12 minutes	
Define cursor attribute	ESC [3 ; Ps z
Ps = 0 invisible cursor	
Ps = 1 blinking block	
Ps = 2 steady block	
Ps = 3 blinking underscore	
Ps = 4 steady underscore	
Define contrast	ESC [4 ; Ps z
Ps = 0 - 7 where 0 is the lowest and 7 is the highest contrast	

Define keyclick	ESC [6 ; Ps z
Ps = 0 keyclick off	
Ps = 1 keyclick on	
Define normal attribute	ESC [7 ; Ps z
Ps = 0 low intensity	
Ps = 1 high intensity	
Screen on/off	ESC [? 7 ; Ps z
Ps = 0 screen off	
Ps = 1 screen on	
Selective graphics rendition	ESC [Ps m
Ps = 0 normal attribute	
Ps = 1 bold intensity on	
Ps = 2 half intensity on	
Ps = 3 blank on	
Ps = 4 underscore on	
Ps = 5 blink on	
Ps = 7 reverse on	
Next page	ESC [Pn U
Previous page	ESC [Pn V
Cursor up	ESC [Pn A
Cursor down	ESC [Pn B
Cursor forward	ESC [Pn C
Cursor backward	ESC [Pn D
Next line	ESC [Pn E
Previous line	ESC [Pn F
Cursor positioning	ESC [Pn ; Pn H
Horizontal/vertical position	ESC [Pn ; Pn f
Clear tab	ESC [Ps g
Ps = 0 clear tab at current position	
Ps = 3 clear all tab positions	
Tab forward	ESC [Pn I
Tab backward	ESC [Pn Z
Local echo on	ESC [12 h
Local echo off	ESC [12 l
New line mode on	ESC [20 h
New line mode off	ESC [20 l
Cursor keys application mode	ESC [? 1 h
Cursor keys normal mode	ESC [? 1 l
Enter VT-52 mode	ESC [? 2 l
Auto wraparound mode	ESC [? 7 h
Auto wraparound off	ESC [? 7 l
Block mode on	ESC [? 10 h
Block mode off (conversational mode on)	ESC [? 10 l
Auto paging on	ESC [? 20 h
Auto paging off	ESC [? 20 l

Lock keyboard	ESC [2 h
Unlock Keyboard	ESC [2 l
Insert mode on	ESC [4 h
Replace mode on	ESC [4 l
White background on (Reverse video)	ESC [? 5 h
Dark background on (Normal video)	ESC [? 5 l
Relative origin mode. send cursor home	ESC [? 6 h
Absolute origin mode on	ESC [? 6 l
Auto repeat on	ESC [? 8 h
Auto repeat off	ESC [? 8 l
Select G0 graphics set	ESC (Ps
Select G1 graphics set	ESC) Ps

Ps = 0 Graphics set
Ps = 1 Multi-national set
Ps = 2 Mosaic set
Ps = A U. K.
Ps = B U. S. ASCII

Set top/bottom margin set	ESC [Pt ; Pb r
Multipage cursor positioning	ESC [Pn ; Pn ; Pn s
Fill screen with 'H's for alignment	ESC # 8
ID request	ESC Z or
	ESC [0 c
Cursor position report	ESC [6 n
Index	ESC D
Next line	ESC E
Reverse index	ESC M
Save cursor position	ESC 7
Restore cursor position	ESC 8
Horizontal tab set	ESC H
Reset to initial state	ESC c
Application keypad mode	ESC =
Numeric keypad mode	ESC >
Trnasfer execution	ESC 5
User line text entry	ESC ^ Data CR
Clear function key	ESC !
Clear margin bell	ESC n
Set Margin bell	ESC o

A-3. VT-52

FUNCTION	COMMANDS
Cursor up	ESC A
Cursor down	ESC B
Cursor right	ESC C
Cursor back	ESC D
Graphics on	ESC F
Graphics off	ESC G
Cursor home	ESC H
Reverse linefeed	ESC I
Erase to end of page	ESC J
Erase to end of line	ESC K
Cursor addressing	ESC Y R,C
Device report to host	ESC Z
Numeric keypad mode	ESC =
Application keypad mode	ESC >
Enter ANSI mode	ESC <
Back tab	ESC T
Disable 25th line	ESC e
Enable user line	ESC g
Enable status line	ESC h
Conversation mode on	ESC c
Full duplex mode on	ESC)
Half duplex mode on	ESC (
Set the margin bell	ESC o
Clear the margin bell	ESC n
print all	ESC P
Auto page on	ESC v
Auto page off	ESC w

A-4 DG-100/200

FUNCTION	COMMAND
Screen print full intensity only	CTRL/A
Enable blink	CTRL/C
Disable blink	CTRL/D
Cursor read	CTRL/E
Ring bell	CTRL/G

Cursor home	CTRL/H
Tab	CTRL/I
New line	CTRL/J
Erase to the end of line	CTRL/K
Clear the whole page	CTRL/L
Carriage return	CTRL/M
Blink on	CTRL/N
Blink off	CTRL/O
Cursor write (addressing)	CTRL/P , <col>, <row>
Print all	CTRL/Q
Enable roll mode	CTRL/R
Disable roll mode	CTRL/S
Underscore on	CTRL/T
Underscore off	CTRL/U
Cursor up	CRRL/W
Cursor forward	CTRL/X
Cursor backward	CTRL/Y
Cursor down	CTRL/Z
Dim on	CTRL/\
Dim off	CTRL/]
Reverse video on	CTRL/^, D
Reverse video off	CTRL/^, E
CSI sequence introducer, all CSI commands are supported	ESC [
Answerback request	ESC E
Display user line	ESC g
Display status line	ESC h

A-5. Emulation Mode Independent Commands

FUNCTION	COMMAND
Function key programming	ESC ! P1 P2 <data> Ctrl/Y
answerback programming	ESC] data CR
Graphics block drawing	ESC [Ps ; Pw ; Pd sp p
Ps = 0 solid block filled with underline	
Ps = 1 solid block filled with reverse video	
Ps = 2 solid block filled with blink attribute	
Ps = 3 solid block filled with blank attribute	
Ps = 4 hollow block with thin line	
Graphics line drawing	ESC [Ps ; Pl sp p
Ps = 6 horizontal line	
Ps = 8 vertical line	
Write a triple sized character	ESC [Ps x
Ps is an decimal ASCII value for the character to be written	

Load clock	ESC sp 1 A/P h1 h2 m1 m2
Report time	ESC sp 2
Print time	ESC V
User line programming	ESC f <data> CR

APPENDIX B

U.S. ASCII CHART

USASCII CHART (CODES GENERATED FOR ENGLISH CHARACTER SET)

Bits b_7 b_6 b_5 →					0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b_4	b_3	b_2	b_1	Row / Column	0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	@	P		p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS ←	CAN	(	8	H	X	h	x
1	0	0	1	9	SKIP HT	EM	)	9	I	Y	i	y
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
1	0	1	1	11	VT ↑	ESC	+	;	K	[	K	{
1	1	0	0	12	FF →	ESC	,	<	L	\	l	¦
1	1	0	1	13	CR	GS	–	=	M	]	m	}
1	1	1	0	14	SO	HOME RS	.	>	N	^	n	~
1	1	1	1	15	SI	NEW LINE US	/	?	O	_	o	DEL RUB

APPENDIX C

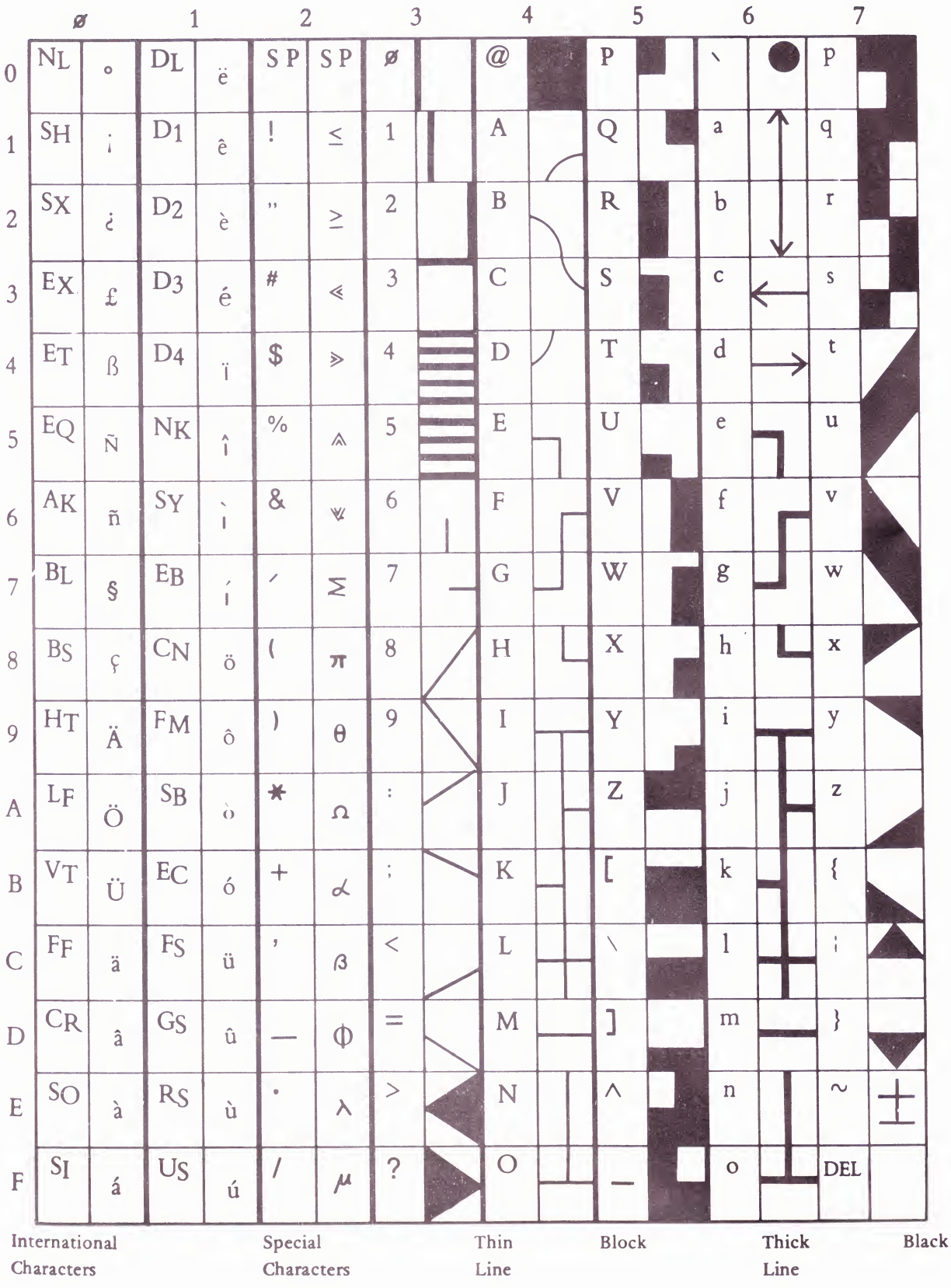
FILL CHARACTER REQUIREMENTS

	FUNCTION NUMBER				
BAUD RATE	I	II	III	IV	V
19.2K	60	4	20	4	4
9600	25	2	10	2	2
7200	18	1	7	1	1
4800	12	1	7		
3600	9		2		
2400	6		1		
1800	4				
1200	2				
600	1				
300					
150					
135					
110					
75					
50					

Function I : Line Feed (LF) with 25 th Line
Function II : Line Feed (LF) without 25th Line
Function III : Erase Page (EOP), Clear Page, Fill Screen, Insert or Delete Line
Function IV : Enable or Disable 25th Line
Function V : Insert or Delete Character, Clear Function Key

APPENDIX D-1

KT-7 SPECIAL GRAPHIC CHARACTER CODE TABLE



APPENDIX D-2

DEC SPECIAL GRAPHIC CHARACTER CODE TABLE

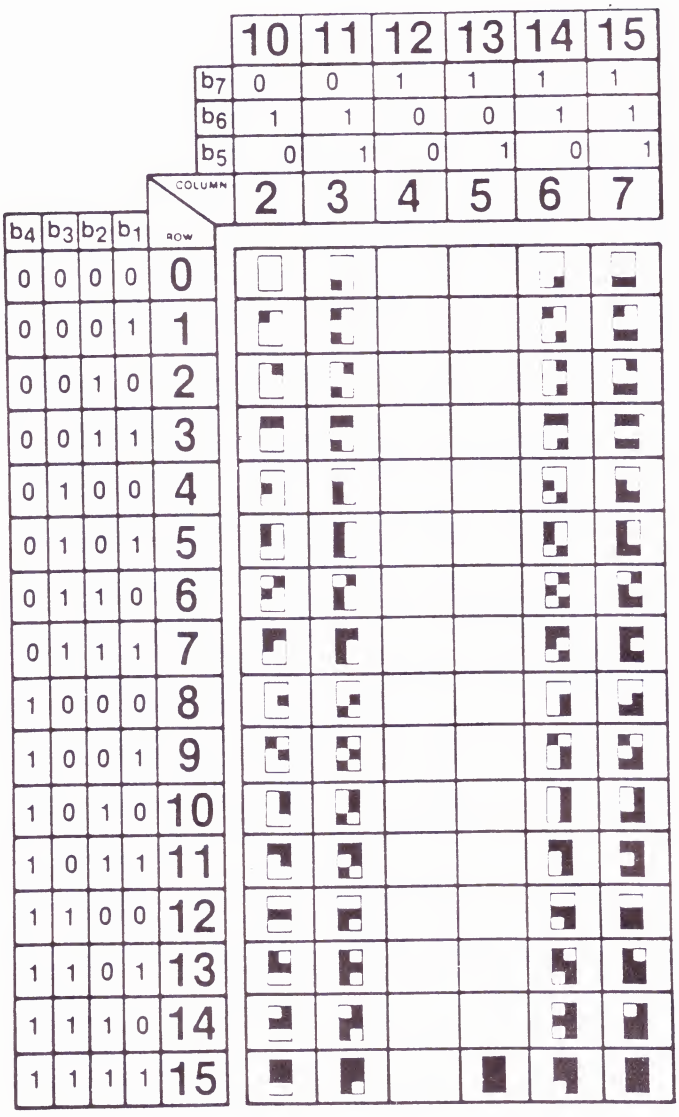
B7 B6 B5 / BITS B4 B3 B2 B1	ROW	0 0 0 COLUMN 0	0 0 1 1	0 1 0 2	0 1 1 3	1 0 0 4	1 0 1 5	1 1 0 6	1 1 1 7
0 0 0 0	0	NUL 0 0 0	20 16 10	SP 40 32 20	0 60 48 30	@ 100 64 40	P 120 80 50	140 96 60	— 160 112 70
0 0 0 1	1	1 1 1	DC1 (XON) 21 17 11	! 41 33 21	1 61 49 31	A 101 65 41	Q 121 81 51	141 97 61	— 161 113 71
0 0 1 0	2	2 2 2	22 18 12	" 42 34 22	2 62 50 32	B 102 66 42	R 122 82 52	142 98 62	— 162 114 72
0 0 1 1	3	ETX 3 3 3	DC3 (XOFF 23 19 13	# 43 35 23	3 63 51 33	C 103 67 43	S 123 83 53	143 99 63	— 163 115 73
0 1 0 0	4	EOT 4 4 4	24 20 14	$ 44 36 24	4 64 52 34	D 104 68 44	T 124 84 54	144 100 64	┼ 164 116 74
0 1 0 1	5	ENQ 5 5 5	25 21 15	% 45 37 25	5 65 53 35	E 105 69 45	U 125 85 55	145 101 65	┤ 165 117 75
0 1 1 0	6	6 6 6	26 22 16	& 46 38 26	6 66 54 36	F 106 70 46	V 126 86 56	146 102 66	⊥ 166 118 76
0 1 1 1	7	BEL 7 7 7	27 23 17	' 47 39 27	7 67 55 37	G 107 71 47	W 127 87 57	± 147 103 67	┬ 167 119 77
1 0 0 0	8	BS 10 8 8	CAN 30 24 18	(50 40 28	8 70 56 38	H 110 72 48	X 130 88 58	150 104 68	│ 170 120 78
1 0 0 1	9	HT 11 9 9	31 25 19	) 51 41 29	9 71 57 39	I 111 73 49	Y 131 89 59	151 105 69	≤ 171 121 79
1 0 1 0	10	LF 12 10 A	SUB 32 26 1A	* 52 42 2A	: 72 58 3A	J 112 74 4A	Z 132 90 5A	152 106 6A	≥ 172 122 7A
1 0 1 1	11	VT 13 11 B	ESC 33 27 1B	+ 53 43 2B	; 73 59 3B	K 113 75 4B	[133 91 5B	153 107 6B	π 173 123 7B
1 1 0 0	12	FF 14 12 C	34 28 1C	, 54 44 2C	< 74 60 3C	L 114 76 4C	\ 134 92 5C	154 108 6C	≠ 174 124 7C
1 1 0 1	13	CR 15 13 D	35 29 1D	- 55 45 2D	= 75 61 3D	M 115 77 4D	] 135 93 5D	155 109 6D	£ 175 125 7D
1 1 1 0	14	SO 16 14 E	36 30 1E	. 56 46 2E	> 76 62 3E	N 116 78 4E	^ 136 94 5E	156 110 6E	· 176 126 7E
1 1 1 1	15	SI 17 15 F	37 31 1F	/ 57 47 2F	? 77 63 3F	O 117 79 4F	(BLANK) 137 95 5F	— SCAN 1 157 111 6F	177 127 7F

KEY

ASCII CHARACTER: ESC / 33 (OCTAL) / 27 (DECIMAL) / 1B (HEX)

APPENDIX E

MOSAIC CHARACTER CODE TABLE



APPENDIX F

MULTINATIONAL CHARACTER CODE TABLE

0	1	2	3	4	5	6	7	COLUMN BITS b8 b7 b6 b5 / b4 b3 b2 b1	ROW
200 128 80	220 144 90	240 160 A0	260 176 B0	300 192 C0	320 208 D0	340 224 E0	360 240 F0	0 0 0 0	0
201 129 81	221 145 91	¡ 241 161 A1	± 261 177 B1	Á 301 193 C1	Ñ 321 209 D1	á 341 225 E1	ñ 361 241 F1	0 0 0 1	1
202 130 82	222 146 92	¢ 242 162 A2	2 262 178 B2	Â 302 194 C2	Ò 322 210 D2	â 342 226 E2	ò 362 242 F2	0 0 1 0	2
203 131 83	223 147 93	£ 243 163 A3	3 263 179 B3	Ã 303 195 C3	Ó 323 211 D3	ã 343 227 E3	ó 363 243 F3	0 0 1 1	3
204 132 84	224 148 94	244 164 A4	264 180 B4	Ä 304 196 C4	Ô 324 212 D4	ä 344 228 E4	ô 364 244 F4	0 1 0 0	4
205 133 85	225 149 95	¥ 245 165 A5	µ 265 181 B5	À 305 197 C5	Õ 325 213 D5	à 345 229 E5	õ 365 245 F5	0 1 0 1	5
206 134 86	226 150 96	246 166 A6	¶ 266 182 B6	Æ 306 198 C6	Ö 326 214 D6	æ 346 230 E6	ö 366 246 F6	0 1 1 0	6
207 135 87	227 151 97	§ 247 167 A7	· 267 183 B7	Ç 307 199 C7	Œ 327 215 D7	ç 347 231 E7	œ 367 247 F7	0 1 1 1	7
210 136 88	230 152 98	¤ 250 168 A8	270 184 B8	È 310 200 C8	Ø 330 216 D8	è 350 232 E8	ø 370 248 F8	1 0 0 0	8
211 137 89	231 153 99	© 251 169 A9	1 271 185 B9	É 311 201 C9	Ù 331 217 D9	é 351 233 E9	ù 371 249 F9	1 0 0 1	9
212 138 8A	232 154 9A	ª 252 170 AA	º 272 186 BA	Ê 312 202 CA	Ú 332 218 DA	ê 352 234 EA	ú 372 250 FA	1 0 1 0	10
213 139 8B	233 155 9B	« 253 171 AB	» 273 187 BB	Ë 313 203 CB	Û 333 219 DB	ë 353 235 EB	û 373 251 FB	1 0 1 1	11
214 140 8C	234 156 9C	254 172 AC	¼ 274 188 BC	Ì 314 204 CC	Ü 334 220 DC	ì 354 236 EC	ü 374 252 FC	1 1 0 0	12
215 141 8D	235 157 9D	255 173 AD	½ 275 189 BD	Í 315 205 CD	Ý 335 221 DD	í 355 237 ED	ý 375 253 FD	1 1 0 1	13
216 142 8E	236 158 9E	256 174 AE	276 190 BE	Î 316 206 CE	336 222 DE	î 356 238 EE	376 254 FE	1 1 1 0	14
217 143 8F	237 159 9F	257 175 AF	¿ 277 191 BF	Ï 317 207 CF	ß 337 223 DF	ï 357 239 EF	377 255 FF	1 1 1 1	15

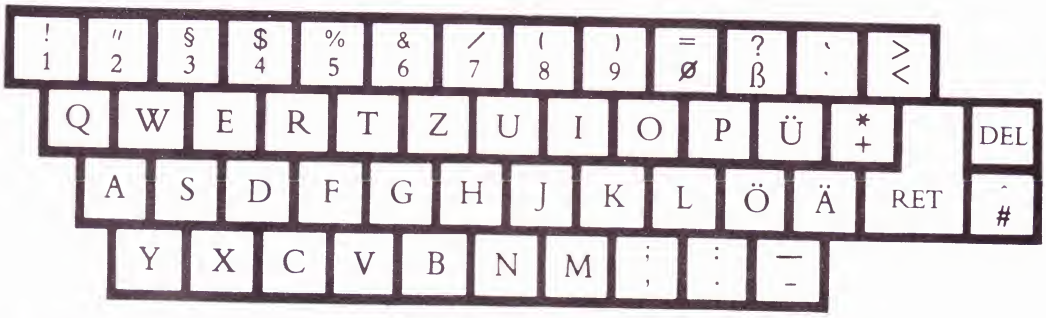
APPENDIX G

CURSOR ADDRESSING CODES

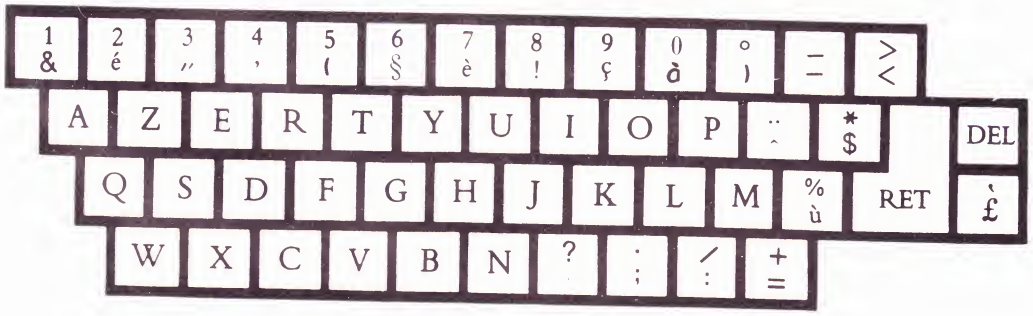
Value of R or C*	ASCII Code/ Keystroke	Value of C	ASCII Code/ Keystroke
1	SPACE	41	H
2	!	42	I
3	"	43	J
4	#	44	K
5	$	45	L
6	%	46	M
7	&	47	N
8	'	48	O
9	(	49	P
10	)	50	Q
11	*	51	R
12	+	52	S
13	,	53	T
14	-	54	U
15	.	55	V
16	/	56	W
17	0	57	X
18	1	58	Y
19	2	59	Z
20	3	60	[
21	4	61	\
22	5	62	]
23	6	63	^
24	7	64	_
25	8	65	`
26	9	66	a
27	:	67	b
28	;	68	c
29	<	69	d
30	=	70	e
31	>	71	f
32	?	72	g
33	@	73	h
34	A	74	i
35	B	75	j
36	C	76	k
37	D	77	l
38	E	78	m
39	F	79	n
40	G	80	o

APPENDIX H

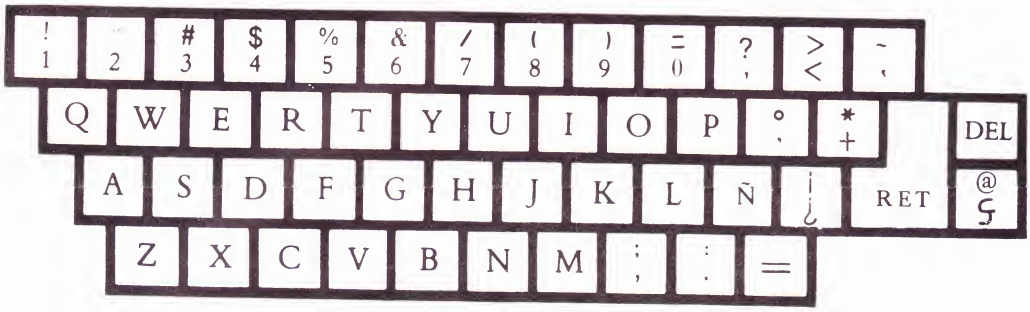
KEYBOARD LAYOUT IN INTERNATIONAL LANGUAGE



German Character Set: Keyboard Layout



French Character Set: Keyboard Layout



Spanish Character Set: Keyboard Layout

APPENDIX I

CONTROL CHARACTER SYMBOLS

KEY STROKE	ASCII CODE	SYMBOL
CTRL/@	NULL (00H)	N_L
CTRL/A	SOH (01H)	S_H
CTRL/B	STX (02H)	S_X
CTRL/C	ETX (03H)	E_X
CTRL/D	EOT (04H)	E_T
CTRL/E	ENQ (05H)	E_Q
CTRL/F	ACK (06H)	A_K
CTRL/G	BEL (07H)	B_L
CTRL/H	BS (08H)	B_S
CTRL/I	HT (09H)	H_T
CTRL/J	LF (0AH)	L_F
CTRL/K	VT (0BH)	V_T
CTRL/L	FF (0CH)	F_F
CTRL/M	CR (0DH)	C_R
CTRL/N	SO (0EH)	S_O
CTRL/O	SI (0FH)	S_I
CTRL/P	DLE (10H)	D_L
CTRL/Q	DC1 (11H)	D_1
CTRL/R	DC2 (12H)	D_2
CTRL/S	DC3 (13H)	D_3
CTRL/T	DC4 (14H)	D_4
CTRL/U	NAK (15H)	N_K
CTRL/V	SYN (16H)	S_Y
CTRL/W	ETB (17H)	E_B
CTRL/X	CAN (18H)	C_N
CTRL/Y	EM (19H)	E_M
CTRL/Z	SUB (1AH)	S_B
CTRL/{	ESC (1BH)	E_C
CTRL/\	FS (1CH)	F_S
CTRL/}	GS (1DH)	G_S
CTRL/^	RS (1EH)	R_S
CTRL/_	US (1FH)	U_S